

COMPREHENSIVE LAND USE PLAN FOR THE VILAS COUNTY FOREST

TABLE OF CONTENTS

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CHAPTER 300

DESCRIPTION OF FOREST AND MANAGEMENT PLANNING

<u>Section</u>	<u>Subject</u>	<u>Page</u>
300	DESCRIPTION OF FOREST	
300.1	COUNTY FOREST OWNERSHIP	
300.2	NATURAL FEATURES	
300.2.1	Topography	
300.2.2	Geography	
300.2.3	Geology & Soils	
300.2.4	Biological Communities	
300.2.5	Vegetative Cover Types	
300.2.6	Fish and Wildlife	
300.2.7	Rare and Endangered Resources	
300.2.8	Water	
300.3	CULTURAL FACTORS	
300.3.1	Economy	
300.3.2	Education and Research	
300.4	OTHER PUBLIC LANDS OWNERSHIP	

300 DESCRIPTION OF FOREST

300.1 COUNTY FOREST OWNERSHIP

The County Forest is composed of 40 management compartments ranging in size from 308 acres to nearly 1,725 acres. Within the county forest boundaries (approximately 132 square miles) approximately 35 percent of the land is county owned with most of the remaining 65 percent in small private holdings. A map of these compartments can be found in the **Appendix 1000**

300.2 NATURAL FEATURES

300.2.1 Topography

The Vilas County Forest, located in the Northeastern part of the state, lies primarily within the Northern Highlands physiographic region(s) of Wisconsin. The topography of the forest and surrounding area has glacial origin.

Three separate lobes of the glacier covered portions of Vilas County including the Langlade Lobe in the northeast, the Ontonagon Lobe in the north and northeast and the Wisconsin Valley lobe in the central and western parts of the county. When the glaciers retreated, the pre-glacier uneven rocky terrain was transformed into a diverse landscape.

Vilas County's diverse landscape ranges from broad, nearly level outwash plains to pitted outwash plains to rough, broken glacial moraines. Vilas County has three distinct physiographic areas including the drumlins and ground moraines in the eastern part of the county, the Winegar Moraine region across the northwest part of the county, and the outwash and pitted outwash plains which cover the remainder.

Elevations on the County forest range from 1800 feet above sea level in the northern part of the forest to 1270 feet above sea level in central part of the forest to 1725 feet above sea level in the southern part of the forest. The terrain ranges from hilly in the northern part of the forest, to flat (gently rolling / flat / hilly) in the central part of the forest to gently rolling in the southern part of the forest.

300.2.2 Geography

Vilas County has a land area of approximately 555,374 acres, plus another 96,693 acres of water included in lakes and streams. Approximately 97 percent of the land in the county is classified as forest land. The County Forest contains approximately 41,141 acres.

Appendix 1000 contains maps showing the location of the County Forest.

300.2.3 Geology and Soils

Based upon the Natural Resources Conservation Service Soil Survey the following Soil Types are found on the Vilas County Forest:

Soil Types of the Vilas County Forest (ranked)		
Series Rank	Soil Series Name	Series Total Acres
1	Sayner-Rubicon complex	10316
2	Rubicon sand	7963
3	Loxley and Dawson peats	3717
4	Pence sandy loam	3602
5	Seelyeville and Markey mucks	2421
6	Croswell sand	2341
7	Keweenaw-Karlin complex	2011
8	Karlin loamy fine sand	1482
9	Kinross mucky sand	1359
10	Champion silt loam	1116
11	Au Gres sand	1115
12	Padus fine sandy loam	896
13	Padus-Pence complex	876
14	Keweenaw-Sayner complex	535
15	Manitowish sandy loam	45
16	Fence-Alcona complex	14
17	Gaastra silt loam	9
18	Monico silt loam	2

Descriptions of the Soils found on the Vilas County Forest are as follows:

SAYNER- RUBICON COMPLEX (SANDS)

Series Rank	Soil Series Name	Series Total Acres
1	Sayner-Rubicon complex	10316

This type consists of very deep, excessively drained soils formed in stratified sand and

gravel on outwash terraces, lake plains, outwash plains, old beaches, kames, eskers, and other glaciofluvial areas within moraines. Permeability is moderately rapid or rapid in the solum and rapid or very rapid in the substratum. Slopes range from 0 to 60 percent. Mean annual precipitation is about 30 inches. Mean annual temperature is about 42 degrees F.

DRAINAGE AND PERMEABILITY: Excessively drained. Runoff ranges from very slow to rapid. Permeability is moderately rapid or rapid in the solum and rapid or very rapid in the substratum.

COMMON USE AND VEGETATION: Most areas are in woodland. Only a small amount of this soil is in cropland. Native vegetation is coniferous and deciduous forest with red pine, eastern white pine, jack pine, northern red oak, red maple, paper birch, balsam fir, and quaking aspen. Ground cover consists of blueberries, wintergreen, sweet fern, and bracken fern.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the present natural vegetation of this soil type is predominantly jack pine, red pine and quaking aspen with some eastern white pine due to historical conversions. The quality and productivity of oak, aspen and white pine on these sites is relatively poor, while quality and productivity of jack pine and red pine are good to excellent.

RUBICON SAND

Series Rank	Soil Series Name	Series Total Acres
2	Rubicon sand	7963

This type consists of very deep, excessively drained soils formed in sandy deposits on disintegration moraines, ground moraines, end moraines, kame moraines, lake plains, outwash plains, stream terraces, beach ridges, and sand dunes. Slope ranges from 0 to 70 percent. Mean annual precipitation is about 787 mm (31 inches), and mean annual air temperature is about 6.1 degrees C (43 degrees F).

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Excessively drained. Potential for surface runoff is negligible to low depending on the slope. Saturated hydraulic conductivity is high or very high.

COMMON USE AND VEGETATION: The majority of this soil is forested, including pine plantations. Some areas are idle cropland or in pasture. Only a very small proportion is used for small grains and hay crops. Ground cover consists of blueberries, wintergreen, sweet fern, and bracken fern. The native vegetation is predominantly red pine and quaking aspen with some eastern white pine and jack pine.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the present vegetation on this soil type is predominantly jack pine, red pine and quaking aspen with some eastern white pine due to historical conversions. The quality and productivity of aspen and white pine on these sites are relatively poor, while quality and productivity of jack pine and red pine are good to

excellent.

LOXLEY AND DAWSON PEATS

Series Rank	Soil Series Name	Series Total Acres
3	Loxley and Dawson peats	3717

These wetland soils consist of very deep, very poorly drained soils formed in herbaceous organic deposits more than 51 inches thick in depressions on moraines, lake plains and outwash plains. These soils have moderately slow to moderately rapid permeability. Slopes range from 0 to 2 percent. Mean annual precipitation is about 30 inches, and mean annual temperature is about 43 degrees F.

DRAINAGE AND PERMEABILITY: Very poorly drained. The representative depth to wet soil moisture status is at the surface to 1 foot below the surface at some time throughout the year. The representative depth of ponding is from 0 to 1.0 foot at some time throughout the year. Surface runoff is negligible to medium. Permeability ranges from moderately slow to moderately rapid.

COMMON USE AND VEGETATION: Very little intensive use is made of these soils because of excess wetness, extreme acidity, and frost hazard. Soil areas usually lack suitable drainage outlets. Ground cover consists principally of blueberry, leatherleaf, sphagnum moss, and wintergreen. Tree vegetation is sparse with black spruce and tamarack comprising the major species, however jack pine and quaking aspen may be present where muck soils are shallow.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the present natural vegetation on this soil type is predominantly black spruce and tamarack with some eastern white pine present in areas of shallow surface soils. The quality and productivity of black spruce and tamarack on these sites is varies based upon water table depth, while quality and productivity of all other species are poor.

PENCE SANDY LOAM

Series Rank	Soil Series Name	Series Total Acres
4	Pence sandy loam	3602

These sandy loam soils are on glacial lake plains, outwash terraces, outwash plains, eskers, and kames within moraines. Slopes range from 0 to 50 percent. Pence soils formed in a thin mantle of loamy alluvium or eolian deposits and in the underlying sand or stratified sandy outwash. Mean annual precipitation ranges from 28 to 33 inches. Mean annual temperature ranges from 36 to 45 degrees F. The frost-free period ranges from about 70 to 135 days. Elevation ranges from 600 to 2000 feet

DRAINAGE AND PERMEABILITY: Somewhat excessively drained. The potential for surface runoff ranges from negligible to high. Permeability is moderate or moderately rapid in the loamy mantle and rapid or very rapid in the sandy outwash.

COMMON USE AND VEGETATION: Most areas remain in woodland. Forest vegetation is mixed coniferous and deciduous forest. Timber stands are mostly sugar maple, paper birch, red maple, American basswood, northern red oak, white ash, eastern hemlock, and eastern white pine. Red pine, aspen, balsam, and yellow birch are also in some stands. Some areas are used for cropland or pastureland. Common crops are corn, small grains, and hay.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of sugar maple, American basswood, eastern hemlock on this soil type exceeds opportunities found on lesser soils, while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are excellent.

SEELYEVILLE AND MARKEY MUCKS

Series Rank	Soil Series Name	Series Total Acres
5	Seelyeville and Markey mucks	2421

The Seelyeville and Markey Muck soils are found in depressions and large basins on nearly level slopes on outwash plains, flood plains, valley trains, glacial lake plains, and glacial moraines. Slope gradients typically are less than 0.5 percent but range to 15 percent in areas with hillside seeps. These soils are formed in highly decomposed organic soil materials that are more than 51 inches thick and that primarily are derived from herbaceous plants. Mean annual air temperature ranges from 36 to 45 degrees F. Mean annual precipitation ranges from 16 to 33 inches. About sixty percent occurs during May through September. Frost-free days range from 88 to 150. The elevation ranges from 600 to 2000 feet. These soils are frozen from December to mid-April.

DRAINAGE AND PERMEABILITY: Very poorly drained. Surface runoff is negligible. Permeability is moderately slow to moderately rapid. Depth to an apparent water table is as high as 0 to 2 feet for sloping sites, and plus 3 to 0 feet and ponded at some time from October through June.

COMMON USE AND VEGETATION: Most of these soils are in native vegetation. Some areas are used for pasture or for hay. A few areas are drained and cropped to specialty crops. Native vegetation in these soil areas are primarily is sedges and grasses. Some areas have scattered alders, willow, tamarack, and bog birch. Areas of this soil type that fall within the Markey types may be forested with black ash, quaking aspen, balsam fir, black spruce, tamarack, northern white-cedar, and paper birch, with limited productivity based upon water levels and depth to mineral soil. Some areas are in cattails, marsh grasses, reeds, and sedges.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of northern white cedar, tamarack, black spruce, and swamp hardwood species are good, while quality and productivity of paper birch and balsam fir are poor. Site conditions dictate the quality of species on this soil type across the forest.

CROSWELL SAND

Series Rank	Soil Series Name	Series Total Acres
6	Croswell sand	2057

The Croswell series consists of very deep, moderately well drained soils formed in sandy glaciofluvial deposits found on ice margin complexes, stream terraces, lake terraces, low dunes, beach ridges, outwash plains, lake plains, and ground moraines. Slope ranges from 0 to 12 percent. These soils formed in sandy glaciofluvial deposits. Mean annual precipitation ranges from 680 to 920 mm. Mean annual temperature ranges from 5 to 9 degrees C. Frost-free period is 90 to 160 days.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained. The depth to the top of a seasonal high water table ranges from 60 to 100 cm between March and June and in October and November in normal years. The potential for surface runoff is negligible or very low. Saturated hydraulic conductivity is high.

COMMON USE AND VEGETATION: Most of these soils are forested. Some areas are idle cropland or in pasture. A small portion of these soils are cultivated with small grains and hay the principle crops. Native vegetation is intermixed hardwoods and conifers, predominantly quaking aspen, black cherry, paper birch, bigtooth aspen, red pine, eastern white pine, jack pine, northern red oak, and red maple.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of northern red oak, black cherry, and black cherry on these soils is low, while quality and productivity of quaking aspen, big tooth aspen, red pine and white pine are good, jack pine productivity and quality is excellent.

KEWEENAW- KARLIN COMPLEX (LOAMY SAND TO LOAMY FINE SAND)

Series Rank	Soil Series Name	Series Total Acres
7	Keweenaw-Karlin complex	2011

The soil complex consists of very deep, well drained soils formed in sandy deposits typically on ground moraines and end moraines, but in some places are on drumlins and islands of till surrounded by outwash. Slopes range from 0 to 70 percent. Mean annual precipitation ranges from 26 to 33 inches, and the mean annual temperature from about 41 to 44 degrees F.

DRAINAGE AND PERMEABILITY: Well drained. Runoff is negligible to high, dependent on slope. Permeability is moderate or moderately rapid.

COMMON USE AND VEGETATION: Most of this soil is forested with the primary species being sugar maple, American basswood, eastern hemlock, northern red oak, paper birch, red

maple, quaking aspen, yellow birch, bigtooth aspen, northern red oak, red pine, eastern white pine and balsam fir. Cleared areas are used for growing hay, potatoes, and small grains.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of sugar maple, American basswood and eastern hemlock on these soils is low, while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are good.

KARLIN LOAMY FINE SAND

Series Rank	Soil Series Name	Series Total Acres
8	Karlin loamy fine sand	1482

The Karlin series consists of very deep, somewhat excessively drained soils formed in sandy deposits on outwash plains, valley trains, stream terraces and ground and end moraines. These soils have moderately rapid permeability in the E and B horizons and rapid permeability in the C horizon. Slopes range from 0 to 75 percent. Mean annual precipitation is about 31 inches, and mean annual temperature is about 42 degrees F.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained. Surface runoff is slow or medium. Permeability is moderately rapid in the A, E, and B horizons and rapid in the C horizon.

COMMON USE AND VEGETATION: Some areas are cropped. The principal crops are potatoes, rye, oats, alfalfa-grass mixtures, and some corn. The remainder is in forest, permanent pasture, or idle. Common trees are sugar maple, yellow birch, bigtooth aspen, northern red oak, American Basswood, red pine and eastern white pine.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of sugar maple and basswood on these soils is low, while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are good.

KINROSS MUCKY SAND

Series Rank	Soil Series Name	Series Total Acres
9	Kinross mucky sand	1359

The Kinross mucky sands consists of very deep, poorly drained and very poorly drained soils formed in glaciofluvial material on outwash plains, stream terraces, lake plains, kame, disintegration and ground moraines. Permeability is rapid. Slopes range from 0 to 3 percent. Mean annual precipitation is about 30 inches, and mean annual temperature is about 43 degrees F.

DRAINAGE AND PERMEABILITY: Poorly drained and very poorly drained The representative depth to wet soil moisture status is at the surface to one foot below the surface at

times during the period from October to June. The representative depth of ponding is from 0.2 to 0.5 foot at some time during the period from October to June. The soil is saturated for a period of 90 to 120 days when the soil temperature is above 5 degrees C. Runoff is negligible. Permeability is rapid.

COMMON USE AND VEGETATION: Most of this soil is in woodland or brush. Black spruce, tamarack, northern white cedar, balsam fir, red maple, and quaking aspen are the principal tree species. Ground cover includes water tolerant grasses and sedges, leatherleaf, sphagnum, and bog rosemary.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County, on this soil type, the quality and productivity of northern white cedar, tamarack, black spruce, and swamp hardwood species are good, while quality and productivity of paper birch and balsam fir are poor. Site conditions dictate the quality of species on this soil type across the forest.

CHAMPION SILT LOAM

Series Rank	Soil Series Name	Series Total Acres
10	Champion silt loam	1116

The Champion silt loam consists of very deep, well drained and moderately well drained soils formed in modified loamy eolian material and in the underling gravelly sandy or loamy glacial till on ground moraines and end moraines. They are shallow or moderately deep to a fragipan. Permeability is moderate in the upper part, very slow in the fragipan, and moderate or moderately rapid in the lower part of the pedon. Slopes range from 0 to 70 percent. Mean annual precipitation is about 30 inches, and mean annual temperature is about 43 degrees F.

DRAINAGE AND PERMEABILITY: Well drained and moderately well drained. The moderately well drained phase has a perched seasonal high water table from 1 to 2 feet below the surface from November to May. Surface runoff is slow to rapid. Permeability is moderate in the upper part, very slow in the fragipan, and moderate or moderately rapid in the lower part of the pedon.

COMMON USE AND VEGETATION: Most areas are forested with sugar maple, yellow birch, eastern hemlock, quaking aspen, and balsam fir.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of sugar maple, American basswood, eastern hemlock on this soil type exceeds opportunities found on lesser soils, while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are excellent

AU GRES SAND

Series Rank	Soil Series Name	Series Total Acres
11	Au Gres sand	1115

Au Gres sand soils are on ice margin complexes, kame moraines, stream terraces, outwash plains, lake plains, lake terraces, and ground moraines of Wisconsinan age. Slope gradients are predominantly 0 to 3 percent and range from 0 to 6 percent. The Au Gres soils formed in sandy fluvial and lacustrine deposits. Mean annual precipitation ranges from 680 to 911 mm (27 to 36 inches). Mean annual temperature ranges from 4.4 to 8.3 degrees C (40 to 47 degrees F). Frost-free period is 90 to 146 days. Elevation is 183 to 549 meters (600 to 1,800 feet) above mean sea level.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat poorly drained. Depth to the top of a seasonal high water table ranges from 18 to 46 cm (0.5 to 1.5 feet) at some time between October and June in normal years. The soil is saturated for a period of 70 to 90 days when the soil temperature is above 5 degrees C. Potential surface runoff is negligible or very low. Saturated hydraulic conductivity is high or very high.

COMMON USE AND VEGETATION: Only a small part is cultivated. Some areas are in permanent pasture and others are used for growing special crops such as blueberries and cucumbers. Many areas are in various stages of reforestation. Natural forests are northern white-cedar, balsam fir, hemlock, yellow birch, paper birch, aspen, and red maple.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of northern white cedar, balsam fir, hemlock, and yellow birch exceeds opportunities found on lesser soils, while quality and productivity of aspen and red maple are limited.

PADUS SANDY LOAM

Series Rank	Soil Series Name	Series Total Acres
12	Padus fine sandy loam	896

Padus soils are on glacial lake plains, outwash plains, stream terraces, eskers, kames, and moraines. They formed mostly in loamy alluvial deposits underlain by stratified sandy outwash. Slope gradients range from 0 to 45 percent. Mean annual precipitation ranges from 28 to 33 inches. Mean annual temperature ranges from 39 to 45 degrees F. The frost free period ranges

from about 90 to 135 days. Elevation ranges from 700 to 19500 feet.

DRAINAGE AND PERMEABILITY: Well drained. Surface runoff is slow to very rapid. Permeability is moderate or moderately rapid in the loamy mantle and rapid or very rapid in the sandy outwash.

COMMON USE AND VEGETATION: Most areas are in woodland. Native vegetation is mostly sugar maple, red maple, northern red oak, American basswood, white ash, and eastern hemlock but bigtooth aspen, red pine, and eastern white pine are in some stands. Some areas have been cleared and are used for cropland. Common crops are corn, small grain, and hay. Some areas are used for growing potatoes.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of sugar maple, American basswood, eastern hemlock on this soil type exceeds opportunities found on lesser soils, while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are excellent. This soil type provides the best opportunity for management of northern hardwood species on the Vilas County Forest

PADUS-PENCE COMPLEX (SANDY LOAM)

Series Rank	Soil Series Name	Series Total Acres
13	Padus-Pence complex	876

These soils are on glacial lake plains, outwash terraces, outwash plains, eskers, and kames within moraines. Slopes range from 0 to 50 percent. The soils formed in a thin mantle of loamy alluvium or eolian deposits and in the underlying sand or stratified sandy outwash. Mean annual precipitation ranges from 28 to 33 inches. Mean annual temperature ranges from 36 to 45 degrees F. The frost free period ranges from about 70 to 135 days. Elevation ranges from 600 to 2000 feet.

DRAINAGE AND PERMEABILITY: Well to somewhat excessively drained. The potential for surface runoff ranges from negligible to high. Permeability is moderate or moderately rapid in the loamy mantle and rapid or very rapid in the sandy outwash .

COMMON USE AND VEGETATION: Most areas remain in woodland. Forest vegetation is mixed coniferous and deciduous forest. Timber stands are mostly sugar maple, paper birch, red maple, American basswood, northern red oak, white ash, eastern hemlock, and eastern white pine. Red pine, aspen, balsam, and yellow birch are also in some stands. Some areas are used for cropland or pastureland. Common crops are corn, small grains, and hay.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of sugar maple, American basswood, eastern hemlock on this soil type exceeds opportunities found on lesser soils, while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are excellent. This soil type provides the best opportunity for management of northern hardwood species on the Vilas County Forest

KEWEENAW- SAYNER COMPLEX (LOAMY SAND)

Series Rank	Soil Series Name	Series Total Acres
14	Keweenaw-Sayner complex	535

These soils are on nearly level to very steep areas of outwash terraces, outwash plains, old beaches, kames, eskers, and other glaciofluvial areas within moraines. Slope gradients range from 0 to 60 percent. Slopes are complex in many places. Sayner soils formed in stratified or unsorted sandy and gravelly outwash. Mean annual precipitation ranges from 28 to 33 inches. Mean annual temperature range from 39 to 45 degrees F. The frost free period ranges from about 90 to 135 days. Elevation ranges from 680 to 1950 feet.

DRAINAGE AND PERMEABILITY: Excessively drained. Runoff ranges from very slow to rapid. Permeability is moderately rapid or rapid in the solum and rapid or very rapid in the substratum.

USE AND VEGETATION: Most areas are in woodland. Only a small amount of this soil is in cropland. Native vegetation is coniferous and deciduous forest with red pine, eastern white pine, jack pine, northern red oak, red maple, paper birch, balsam fir, and quaking aspen predominating.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of while quality and productivity of red maple and balsam are good., while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are good.

MANITOWISH SANDY LOAM

Series Rank	Soil Series Name	Series Total Acres
15	Manitowish sandy loam	45

Manitowish soils are on outwash plains and outwash terraces. Slopes range from 0 to 18 percent. These soils formed in a thin mantle of loamy alluvium or eolian deposits overlying sand or stratified sandy outwash. Mean annual precipitation ranges from 28 to 33 inches. Mean annual air temperature ranges from about 39 to 45 degrees F. The frost-free period ranges from about 70 to 120 days. Elevation ranges from 600 to 2000 feet.

DRAINAGE AND PERMEABILITY: Moderately well drained. The potential for surface runoff ranges from negligible to low. Permeability is moderate or moderately rapid in the loamy mantle and rapid or very rapid in the sandy outwash. Manitowish soils have an apparent seasonal high-water table at a depth of 2 to 3.5 feet for 1 month or more per year at some time during the period September to June in 6 or more out of 10 years.

COMMON USE AND VEGETATION: Most areas are used for woodland. Native vegetation is mixed coniferous and deciduous forest with red pine, eastern white pine, paper birch, red

maple, and quaking aspen as common trees. Some small areas are used for cropland. Common crops are corn, small grains, and hay.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of quaking aspen, big tooth aspen, red pine and white pine are good, jack pine productivity and quality excellent.

FENCE SILT LOAM-ALCONA FINE SANDY LOAM COMPLEX

Series Rank	Soil Series Name	Series Total Acres
16	Fence-Alcona complex	14

These soils are on glacial lake plains, moraines and till floored lake plains. Slope gradients range from 0 to 18 percent. These soils formed in mostly silty stratified lacustrine deposits. Mean annual precipitation ranges from 28 to 33 inches. Mean annual temperature ranges from 39 to 45 degrees F. The frost-free period ranges from about 90 to 120 days. Elevation ranges from 700 to 1900 feet.

DRAINAGE AND PERMEABILITY: Moderately well drained. Surface runoff is negligible to medium, dependent on slope. Permeability is moderate in the solum and moderately slow in the substratum. This representative depth to wet soil moisture status is at 1.5 to 6 feet below the surface from September to May.

COMMON USE AND VEGETATION: Most areas are used for woodland. Native vegetation consists of mixed conifers and hardwoods. Common trees are sugar maple, red maple, eastern hemlock, balsam fir, yellow birch, paper birch, American basswood, bigtooth aspen, and quaking aspen. Some areas are used for cropland. Common crops are corn, small grain, and hay.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of sugar maple, American basswood and eastern hemlock on these soils is good, while quality and productivity of northern red oak, big tooth aspen, red pine and white pine are excellent.

GAASTRA SILT LOAM

Series Rank	Soil Series Name	Series Total Acres
17	Gaastra silt loam	9

Gaastra soils formed in silty and loamy glaciofluvial deposits and are on level to gently sloping ground moraines and glacial lake basins. Slopes range from 0 to 4 percent. Mean annual precipitation is 26 to 33 inches; and the mean annual temperature is about 41 to 45 degrees F.

DRAINAGE AND PERMEABILITY: Somewhat poorly drained. Depth to an apparent seasonal high-water table ranges from 1 to 2 feet. Runoff is slow. Permeability is moderately slow.

COMMON USE AND VEGETATION: Nearly all areas of Gaastra soils are wooded. Main species include red maple, American elm, quaking aspen, white ash, white spruce, and balsam fir. Other areas are used for hay or pasture.

VEGETATION ON VILAS COUNTY FOREST: In Vilas County the quality and productivity of red maple and white ash on these soils is good, while quality and productivity of quaking aspen, white spruce and balsam fir are excellent.

MONICO SILT LOAM

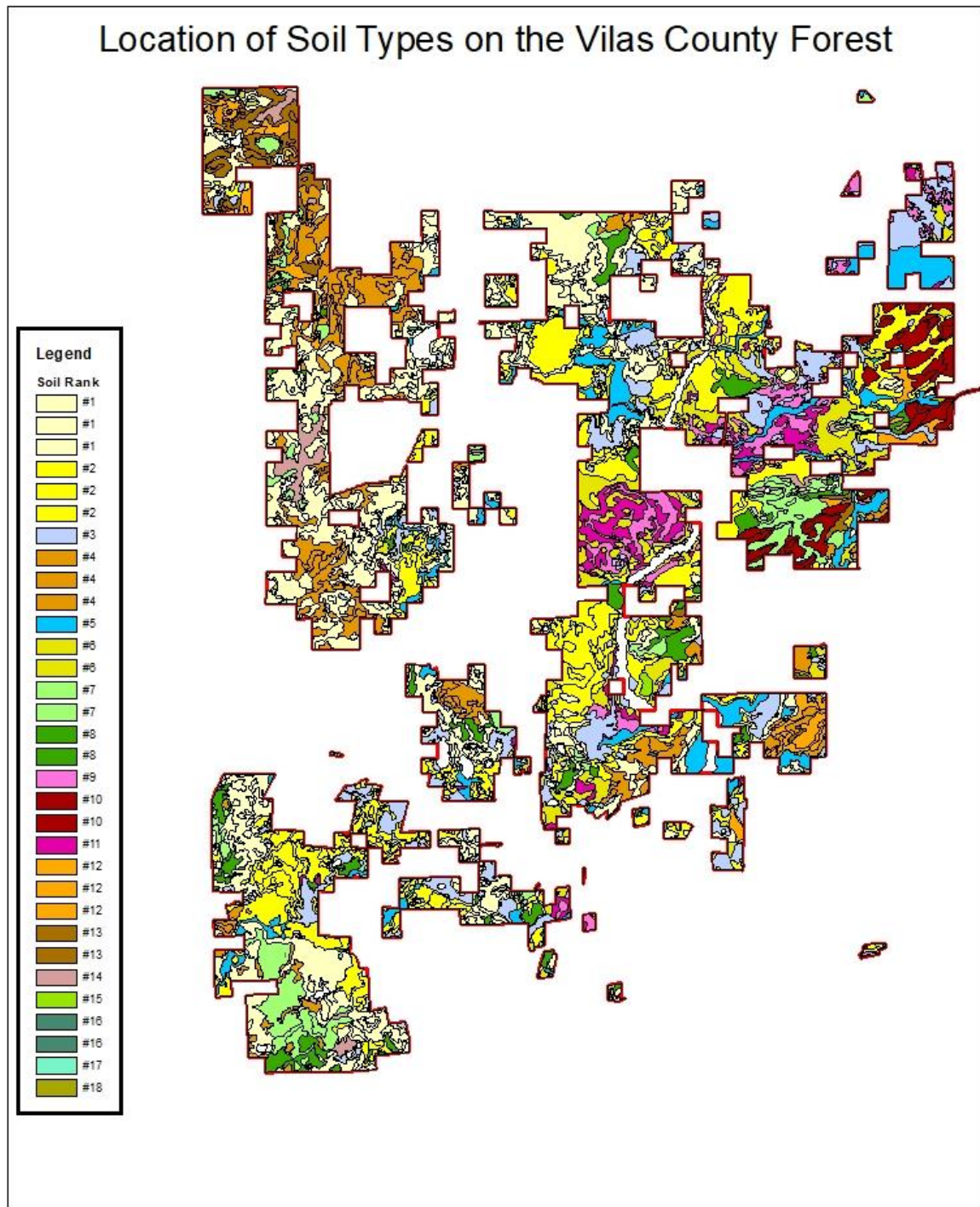
Series Rank	Soil Series Name	Series Total Acres
19	Monico silt loam	2

Monico soils are in depressions and drainageways of ground moraines and in drainageways of interdrumlin areas. Slopes range from 0 to 6 percent. These soils formed in silty or loamy deposits, or both and in the underlying sandy loam or loamy sand till. Mean annual temperature ranges from 39 to 42 degrees F, and mean annual precipitation ranges from 28 to 32 inches.

DRAINAGE AND PERMEABILITY: Somewhat poorly drained. Surface runoff is slow. Permeability is moderate in the silty or loamy deposits and moderately slow in the sandy loam or loamy till.

USE AND VEGETATION: Mostly forest. Forest vegetation is mainly sugar maple, red maple, yellow birch, balsam fir, white spruce, black spruce, and white ash.

Figure 300-1: Distribution of Soil Types on the Vilas County Forest



300.2.4 Ecological Landscapes

Ecological Landscapes are regions in across wide areas containing similar ecological relationships including various plant and animal communities. Identification of these landscapes are based on the National Hierarchical Framework of Ecological Units (NHFUE) (Cleland et al. 1997). More information on the 16 Ecological Landscapes defined within Wisconsin is available at:

<https://dnr.wi.gov/topic/landscapes/index.asp?mode=Choose>

The following Ecological Landscapes are found on the Vilas County Forest:

Vilas County Ecological Landscapes	
Landscape Name	Acres
Northern Highlands	36727
North Central Forest	4222

Descriptions of the Ecological Landscapes found on the Vilas County Forest are as follows:

North Central Forest

Forests cover approximately 75% of the North Central Forest. The mesic northern hardwood forest is dominant, made up of sugar maple, basswood, and red maple, with some stands containing scattered hemlock, yellow birch, and/or eastern white pine pockets. The aspen-birch forest type group is also abundant, followed by spruce-fir (most of the “spruce-fir” here is lowland conifer forests on acid peat—not upland “boreal” forest). Forested and non-forested wetland communities are common and widespread. These include Northern Wet-mesic Forest (dominated by either northern white-cedar or black ash), Northern Wet Forest (acid conifer swamps dominated by black spruce and/or tamarack), and nonforested acid peatlands (bogs, fens, and muskegs). Other relatively common wetland communities here are alder thicket, sedge meadow, and marsh (including wild rice marsh).

Northern Highlands

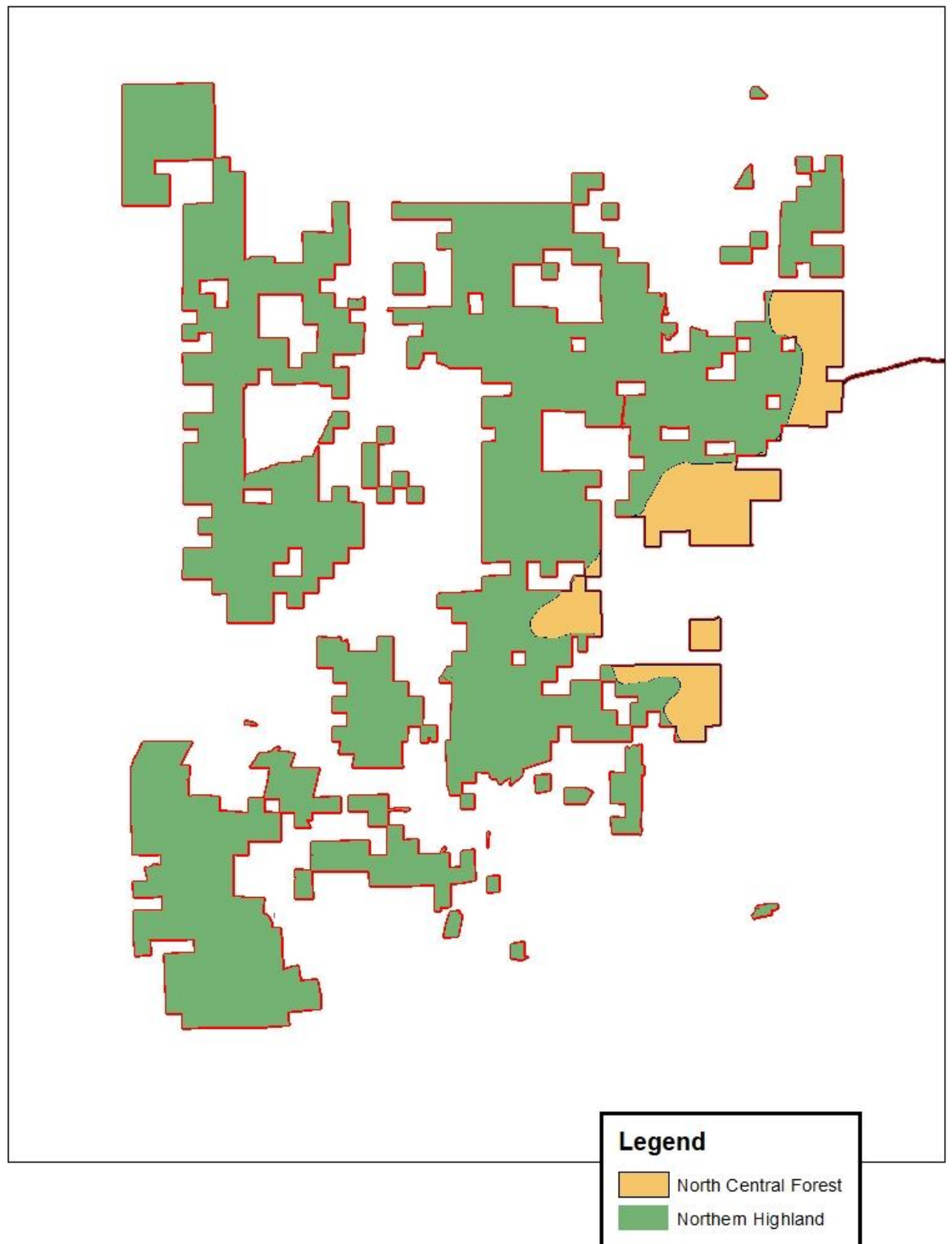
Land cover consists of 48% upland forest, 34% wetlands (both forested and nonforested), 13% open water, 5% grassland and open land, and 1% urban.

Historically, the Northern Highland contained Wisconsin’s greatest pinery. Forests composed of eastern white (*Pinus strobus*) and red (*Pinus resinosa*) pines were the dominant vegetation, with smaller pockets of jack pine (*Pinus banksiana*). Hemlock-hardwood forests were found in some areas with loamier soils. Aspen-birch forests

occurred in openings formed by disturbances such as wind or fire. Overall, quaking aspen (*Populus tremuloides*) is now the primary forest dominant, sometimes mixed with pines (*Pinus* spp.), red maple (*Acer rubrum*), and white birch (*Betula papyrifera*). Much of the red pine and some of the jack pine are now grown in plantations. Northern hardwood forests, though reduced in extent, still occur on the more mesic soils. The many acid peatlands that are scattered throughout this ecological landscape are vegetated with spruce-tamarack swamps, muskeg, and open bog/poor fen communities.

Fire was formerly an important and widespread disturbance factor. Return intervals for wildfires may have been longer here than in some other sandy ecological landscapes (e.g., Northwest Sands). In the Northern Highland, lakes, streams, wetlands, and hills acted as barriers that altered the extent, severity, and behavior of fire. Human development, windthrow, and timber harvest are now the most important disturbances affecting vegetation in this ecological landscape, along with herbivory, ice damage, diseases, and insects. Virtually all of the forest vegetation now is second-growth, excepting those few stands that were “reserved” by the Board of Commissioners of Public Lands as part of the Wisconsin School Trust Land system, conifer swamps of low commercial value, and a few stands that may have been young due to natural disturbances that predated the Cutover by a few years.

Figure 300-1: Distribution of Ecological Landscapes on the Vilas County Forest



300.2.4.1 Land Type Associations

Land type associations (LTA's) are units of the National Hierarchical Framework of Ecological Units (NHFEU) classification system. They are much smaller than Ecological Landscapes and are generally based on glacial features. They can be useful for planning at finer scales within a landscape.

Individual LTA's provide variations in micro-climates, growing seasons variations based upon topography and aspect, water availability based upon soil associations, and ecological relationships which establish management limitations and identify management opportunities. Based upon the ability of a particular LTA to provide habitat requirements of plant species (including trees) and animal species, each LTA can present unique management opportunities and challenges. LTA's, having common ecological characteristics, allow land managers to better plan for future vegetative communities, wildlife species to feature, and compatible recreation uses. On the Vilas County forest, habitat type classification is utilized to determine the appropriate vegetative goals for each particular management unit.

More information is available at:

<https://dnr.wi.gov/topic/landscapes/index.asp?mode=detail&Landscape=11>

The following Land Type Associations are present within the Ecological Landscapes of the Vilas County Forest:

Vilas County Land Type Associations (LTA's)	
LTA Name	LTA Acres
Vilas- Oneida Outwashed Plains	20775
Vilas- Oneida Sandy Hills	12852
Vilas- Oneida Loamy Hills	3100
Iron River/Argonne Drumlins	2592
Argonne Outwashed Plains	1630

Land Type Association Descriptions:

Vilas- Oneida Outwashed Plains:

The characteristic landform pattern is nearly level pitted and unpitted outwash plain with bogs and lakes common. Soils are predominantly excessively drained sand over outwash. Common habitat types include ArQV, forested lowland, PMV, and TMC.

Vilas- Oneida Sandy Hills:

The characteristic landform pattern is rolling collapsed outwash plain with bogs common. Soils are predominantly excessively drained loamy sand over outwash or acid loamy sand debris flow. Common habitat types include PMV, ArQV, forested lowland, AVVb,

Vilas- Oneida Loamy Hills:

The characteristic landform pattern is rolling collapsed outwash plain with bogs and lakes common. Soils are predominantly well drained sandy loam over outwash or acid loamy sand debris flow. Common habitat types include AVVb, PMV, ArQV, ATM, forested lowlands.

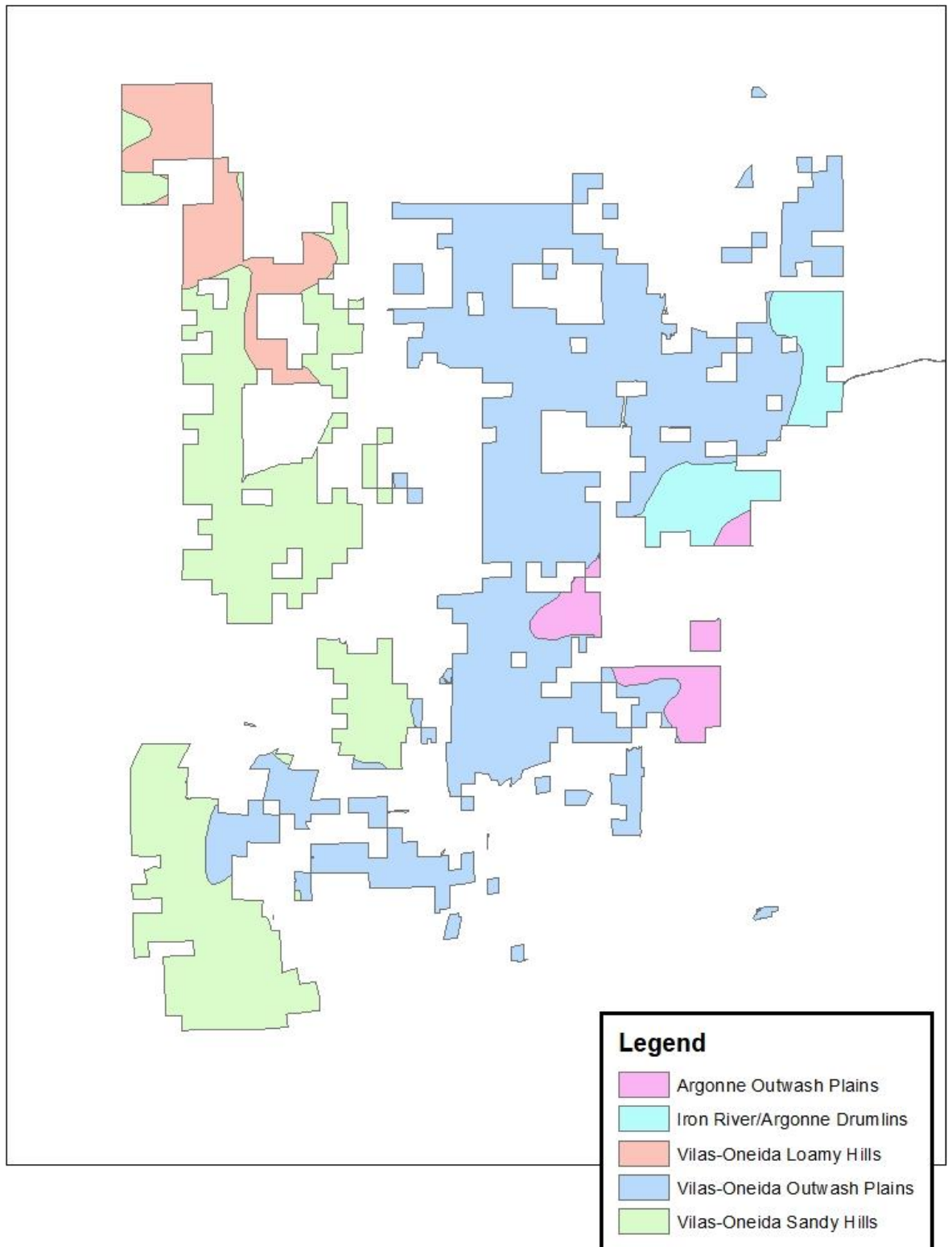
Iron River/Argonne Drumlins:

The characteristic landform pattern is rolling drumlin with inter-drumlin drainageways. Soils are predominantly moderately well drained silt loam over acid loamy sand till. Common habitat types include AViO, TMC, forested lowland, ATM, and ATD.

Argonne Outwashed Plains:

The characteristic landform pattern is undulating pitted and unpitted outwash plain with kame terraces, swamps, and bogs common. Soils are predominantly well drained sandy loam over outwash. Common habitat types include forested lowland, AViO, ATM, AT

Figure 300-2: Distribution of Land Type Associations on the Vilas County Forest



300.2.5 Vegetative Cover Types

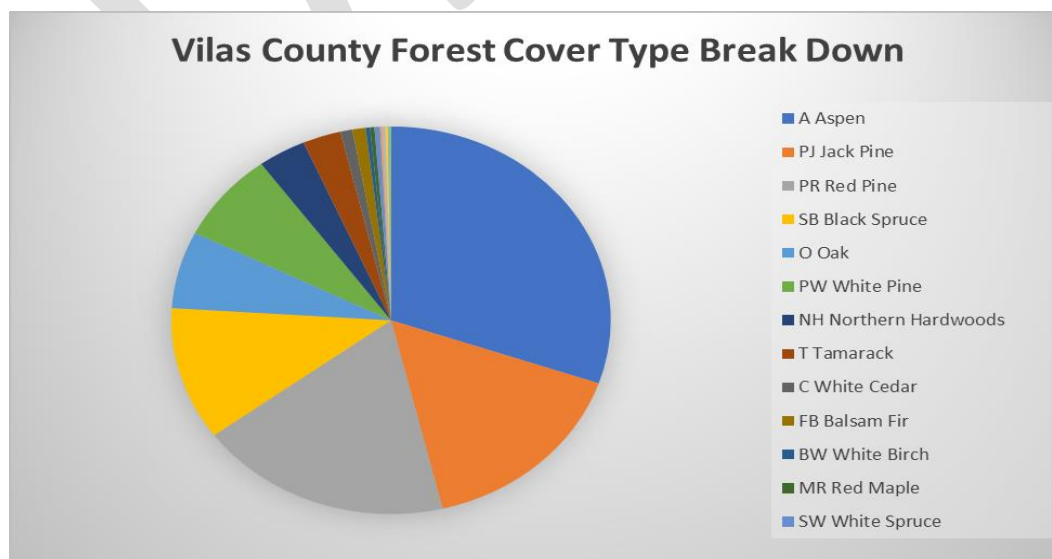
Approximately eighty nine percent (88%) of the Vilas County Forest land base is forested, and approximately eleven percent (12%) of the Vilas County Forest is non-forested. Forested uplands tree species are comprised of primarily aspen, jack pine, red pine, oak, white pine northern hardwoods, white spruce and scrub oak. Tree species including black spruce, tamarack, white cedar, swamp conifer and swam hardwoods occupy the forested lowlands. Non-forested uplands include types such as bracken grasslands, true grasslands, right-of-ways, and recreational areas. Non-forested lowlands include muskegs, bogs, lowland marsh and shrublands, lakes and streams.

FORESTED COMMUNITIES

Over the landscape, micro-climates, soil type, water availability, light availability and space availability determine the ability of land areas to meet the needs of trees and plants species which grow there. Over time trees, plants and wildlife are established in locations where they can compete, grow and prosper. These associations are known as communities.

Forested communities across the landscape are categorized based upon the primary tree species groupings that become established according to land limitations, these are known as forest cover types. Forest cover types are defined by primary tree species, with a variety of size classes (*regeneration, sapling-pole, and saw timber*) and tree density (understocked, stocked, well stocked). Forest cover types also have different structure (*forest canopy layers, ground vegetation, dead and downed material and inclusions based upon the plant associations*). The Vilas County forest contains 13 separate forest cover types.

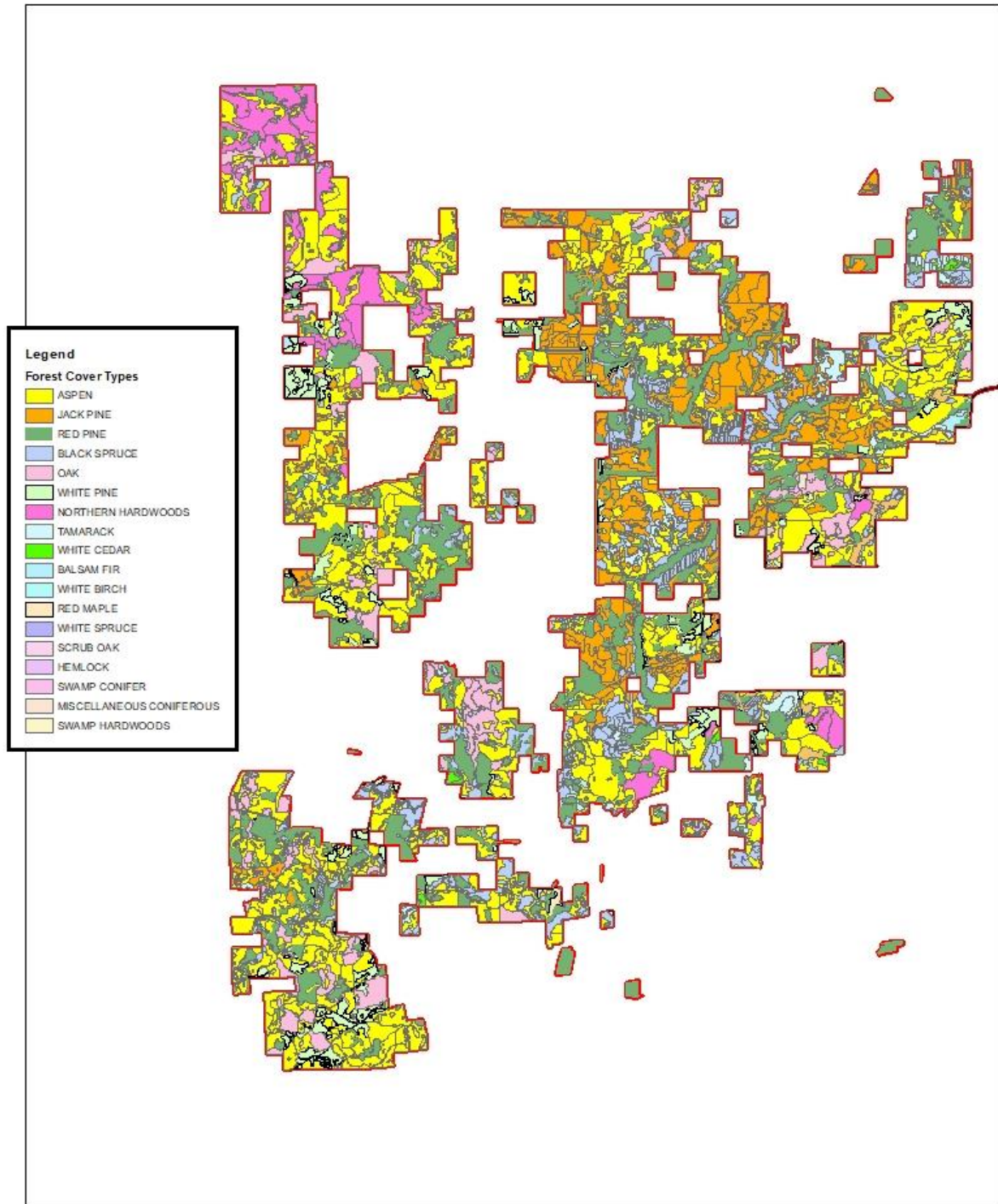
Smaller units of the forest include forest cover types with a defined size class and defined structure are known as a forest stand. The Vilas County Forest manages forest communities at the stand level by manipulation of forest density and structure to benefit the forest type that is best suited to a particular site. The Vilas County forest contains 1242 stands within various cover types



**Vilas County Forest
Breakdown of Forest Cover Type Acreage
Forested Lands- 2020**

Forest Code	Forest Type Description	# of Stands	Acres	Type percent of forested acres
A	Aspen	376	13591	38%
PJ	Jack Pine	198	5453	15%
PR	Red Pine	232	4413	12%
SB	Black Spruce	138	3841	11%
O	Oak	80	2774	8%
PW	White Pine	93	1913	5%
NH	Northern Hardwoods	44	1899	5%
T	Tamarack	35	880	2%
C	White Cedar	11	175	0%
FB	Balsam Fir	12	162	0%
BW	White Birch	4	97	0%
MR	Red Maple	4	67	0%
SW	White Spruce	5	60	0%
OX	Scrub Oak	2	38	0%
H	Hemlock	3	30	0%
SC	Swamp Conifer (old code)	2	30	0%
MC	Miscellaneous Coniferous	1	21	0%
SH	Swamp Hardwoods	2	15	0%
Totals		1242	35459	

Figure 300-1: Distribution of Forested Cover Types on the Vilas County Forest



Description of Forested Cover Types of the Vilas County Forest arranged in order of predominance:

Aspen Cover Type (13,591 Acres)

The Aspen Cover Type is predominant on 38% of the Vilas County Forest covering 13,591 acres in 376 distinct stands. Stand range from 1 year to 120 years or age with the largest acreage of the stands ranging from 36-50 years of age.

Stand Composition

Aspen comprises more than 50% of the basal area in sawtimber and poletimber stands or more than 50% of the stems in sapling and seedling stands. Principal species are bigtooth aspen (*Populus grandidentata*) and trembling aspen (*P. tremuloides*), and Balsam poplar (*P. balsamifera*).

Associated Species

Aspen grows with a variety of trees and shrubs over its extensive range, either as a dominant or an associate. Within the aspen cover type, the predominant associates in Wisconsin currently are (1996 FIA): red maple (*Acer rubrum*), paper birch (*Betula papyrifera*), balsam fir (*Abies balsamea*), red oak (*Quercus rubra*), and white pine (*Pinus strobus*). Most other major tree species occurring in Wisconsin can be found as occasional associates in aspen stands. In Wisconsin, balsam poplar is found mainly in mixed stands where other species dominate.

Soil Preference

The aspen type occurs on a wide range of soil conditions, from sand to clay and from dry to wet. Best growth is demonstrated on dry-mesic and mesic sites with well-drained loamy soils, but growth potential is good for all sites, except dry, excessively drained sands, poorly drained wet sites, and heavy clays. On the Vilas County forest, aspen potential is highest on loamy or sandy loam soils with limited potential on loamy sands and very limited potential on sand soil types.

Range of Habitat Types

The aspen cover type has the potential to develop on all upland habitat type groups and most habitat types in Vilas County, but actual distribution and potential productivity are variable. Some areas on the Vilas County forest have productivity levels where stand decline begins at a point where minimum merchantability standards are barely met.

Jack Pine Cover Type (5,453 Acres)

The Jack Pine Cover Type is predominant on 15% of the Vilas County Forest covering 5,453 acres in 198 distinct stands. Stand range from 1 year to 95 years or age with the largest acreage of the stands in the 6-35 years of age range.

Stand Composition

Jack pine (*Pinus banksiana*) comprises 50% or more of the basal area in poletimber or sawtimber stands, or 50% or more of the stems in seedling and sapling stands.

Associated Species

Jack pine frequently occurs in dense, even-aged stands that originate from major disturbances, such as fire or logging. In stands dominated by jack pine, the most common associates are oak (*Quercus* spp.), red pine (*Pinus resinosa*), white pine (*Pinus strobus*), aspen (*Populus* spp.), and white birch (*Betula papyrifera*). Occasional associates include red maple (*Acer rubrum*), black cherry (*Prunus serotina*), balsam fir (*Abies balsamea*), and white spruce (*Picea glauca*).

Soil Preference

Jack pine grows most commonly on level to gently rolling sand plains, usually of glacial outwash, fluvial, or lacustrine origin. These sandy soils are typically of the Spodosol or Entisol soil orders. Best growth occurs on well-drained loamy sands where the midsummer water table is within 4 to 6 feet of the soil surface. Jack pine will persist on very dry sandy or gravelly soils \ where other species can scarcely survive. It also grows on loamy soils, thin soils over bedrock, and peats. Jack pine has been managed successfully on moist sands and peats, where seasonally high water tables can provide suitable conditions for seed germination and seedling development. Abundance and

Range of Habitat Types

The range of jack pine is primarily located in Canada, extending from the Northwest Territories east to Nova Scotia, and then south into the New England and Great Lake states (Figure 33.1). At the northwest extremities of the range in Alberta, jack pine hybridizes with lodgepole pine (*Pinus contorta*) (93). In the United States, the largest acreages of jack pine are located on sandy soils in Minnesota, Wisconsin, and Michigan.

Jack pine's distribution in Wisconsin is concentrated in the Northwest Sands, Central Sand Plains, Northeast Sands, and Northern Highlands ecological landscapes. Approximately three-quarters of the jack pine volume is found on the sandy soils of northwest and central Wisconsin, with lesser amounts in the northeast, north-central and on other suitable habitats.

Red Pine Cover Type (4,413 Acres)

The Red Pine Cover Type is predominant on 12% of the Vilas County Forest covering 4,413 acres in 232 distinct stands. Stand range from 1 year to 135 years of age with the largest acreage of the stands in the 21-40 year, 61-80 year, and 106-125 year ranges.

Stand Composition

Red pine (*Pinus resinosa*) comprises 50% or more of the basal area in sawtimber and poletimber stands, or 50% or more of the stems in sapling and seedling stands. In mixed pine stands, red pine is predominant.

Associated Species

Many red pine stands are fairly pure with few associates. Pure natural stands typically originate following catastrophic fire. Red pine plantations often are established as monocultures. The most

common associate within the red pine cover type is white pine (*Pinus strobus*). Other major associates are jack pine (*Pinus banksiana*), aspen (*Populus* spp.), and oak (*Quercus* spp.).

Soil Preference

The red pine cover type is most common on dry (excessively to somewhat excessively drained), nutrient poor to medium sands in historically fire-prone landscapes dominated by sandy outwash, lacustrine, or washed till deposits. Productivity can be good to excellent on many of these soils, but is only fair on the driest, most nutrient poor sands. Examples of soil characteristics that improve productivity (increase moisture and nutrient availability) are: finer textures (loamy sands), the presence of finer textured lenses or layers, underlying deposits (e.g. sand outwash over sandy loam till), and the presence of a water table at a depth of 4-9 feet. Red pine stands also occur on moist (moderately well to somewhat poorly drained) sands; productivity is generally good (to excellent), but decreases as soils become wetter. Red pine plantations have been managed successfully on well drained to somewhat poorly drained loams and clays. On these moister and richer soils, natural stands sometimes occurred (historically) within landscapes where the fire regime was conducive to the regeneration and maintenance of red pine. Well drained (sandy) loams offer the greatest potential productivity. Red pine generally does not grow well where the surface soil is alkaline (pH >6.5). Red pine stands generally do not survive and grow on poorly drained soils.

Range of Habitat Types

The red pine cover type occupies about 4% of statewide forest land acres (1996 FIA). It currently is more common in northern than in southern Wisconsin. Within the state, about 65% of red pine cover type acres and 73% of red pine net growing stock volume occur on northern habitat types. Southern Wisconsin habitat types contain about 35% of statewide red pine acres and 27% of the volume.

In northern Wisconsin, the occurrence and relative growth potential of the red pine cover type varies by habitat type groups and habitat types. Red pine is a common cover type on very dry to dry and dry to dry-mesic sites (habitat type groups); about 70% of the red pine cover type acres and 64% of the red pine volume in northern Wisconsin occur on these two groups. Red pine is a minor cover type on the dry-mesic, mesic, and mesic to wet-mesic habitat type groups. It generally does not occur on wet-mesic to wet sites.

Black Spruce Cover Type (3,841 Acres)

The Black Spruce Cover Type is predominant on 11% of the Vilas County Forest covering 3,841 Acres in 138 distinct stands. Stand range from 1 year to 120 years or age with the largest acreage of the stands in the 9-25 year and 79-101 year ranges.

Stand Composition

More than 50 percent swamp conifers with black spruce (*Picea mariana*) predominant.

Associated Species

Common associates include: tamarack (*Larix laricina*), northern white cedar (*Thuja occidentalis*)

and balsam fir (*Abies balsamea*). Occasional associates include: white spruce (*Picea glauca*), hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), jack pine (*P. banksiana*), balsam poplar (*Populus balsamifera*), quaking aspen (*P. tremuloides*), black ash (*Fraxinus nigra*), red maple (*Acer rubrum*), paper birch (*Betula papyrifera*) and yellow birch (*B. allegheniensis*).

Soil Preference

Black spruce is found almost entirely on peat bogs, muck-filled seepages, and stream courses in Wisconsin. Occasionally black spruce will be found on mineral soil adjacent to a swamp that contains black spruce. A few plantations of black spruce have also been established on upland sites.

Range of Habitat Types

Hydric (wet) site habitat types have not been developed for Wisconsin. Habitat types for swamp conifers were determined for upper Michigan (Coffman et al., 1980) and include TTM (*Tsuga-Thuja-Mitella*), TTS (*Tsuga-Thuja-Sphagnum*), PO (*Picea-Osmunda*), and PCS (*Picea-Chamaedaphne-Sphagnum*). However, these types are based on very limited sampling and have not been studied adequately to offer useful management information

Oak Cover Type (2,774 Acres)

The Oak Cover Type is predominant on 8% of the Vilas County Forest covering 2,774 Acres in 80 distinct stands. Stand range from 11 year to 130 years or age with the largest acreage of the stands in the 30-50 year age classes and the 80-115 year age classes.

Stand Composition

Oak comprises 50% or more of the basal area in poletimber and sawtimber stands, or 50% or more of the stems in seedling and sapling stands. In Vilas County the common upland oak species are: northern red oak (*Quercus rubra*) and northern pin oak (*Q. ellipsoidalis*)

Soil Preference

Oak Communities on Northern Wisconsin Sites

1. Northern Dry (very dry to dry and dry to dry-mesic habitat type groups) Oak is a common cover type. Characteristic dominants in oak forests are northern pin oak and red oak. Common associates include: aspen, white pine, red pine, jack pine, red maple, and white birch. Typical surface soil textures are sand and loamy sand. This is the most common oak site on the Vilas County Forest, however the productivity of the oak on these sites is limited with pin oak dominating the sites.

2. Northern Dry-mesic (dry-mesic habitat type group) Oak is a common cover type. The characteristic dominant in oak forests is northern red oak. Common associates include: aspen, red maple, sugar maple, white birch, white pine, and basswood. Typical surface soil textures are loamy sand and sandy loam. These areas are the have the good growth and quality potential for red oak on the Vilas County forest, however competition from aspen, white pine and red maple often limits regeneration and success of the oak on these sites.

3. Northern Mesic (mesic habitat type group) Oak is a minor cover type. The characteristic dominant in oak forests is northern red oak. Common associates include: sugar maple, basswood, red maple, aspen, white birch, and ashes. Typical surface soil textures are sandy loam and silt loam. These areas are the have the best growth and quality potential for red oak on the Vilas County forest, however they are relatively scattered and rare, usually associated with ridge tops. Competition from aspen, white pine and red maple often limits regeneration and success of the oak on these sites.

4. Northern Wet-mesic and Wet (mesic to wet-mesic and wet-mesic to wet habitat type groups)¹ Oak is a minor to rare cover type on these sites. Soils exhibit impeded drainage (any texture).

Regeneration and Competition Site factors influence oak regeneration potential, and vary by habitat type (group). The potential for and success of oak regeneration is strongly influenced by the density, size, and type of competing vegetation. This level of competition is influenced by habitat type and disturbance history. On most sites, significant oak regeneration is unlikely unless competing vegetation is limited through natural disturbance (e.g. fire) or controlled by human cultural activities (e.g. release). In general, the necessary intensity and frequency of control of competing vegetation is greatest on the more mesic sites, because of the presence and vigorous growth of shade tolerant advance regeneration. Often, on drier sites competition is less intense which can facilitate the success of targeted oak regeneration practices.

Stand disturbance history (type, severity, and timing) can significantly alter expected levels of competition. For example, dense shrub layers (e.g. hazel) can develop following successive thinnings and exclude oak regeneration on dry sites. Shrubs and invasive exotic plants can become abundant and provide intense competition across a wide range of habitat types; this problem is particularly prevalent on sites that were previously non-forested (e.g. agricultural lands or historic savannas). Aggressive shrub and herb layers can out-compete oak seedlings; intensive management techniques may be required to control competition and establish regeneration. Within each stand being managed, established competition and potential control measures should be evaluated.

White Pine Cover Type (1,913 Acres)

The White Pine Cover Type is predominant on 5% of the Vilas County Forest covering 1,913 Acres in 93 distinct stands. Stand range from 1 year to 135 years of age with the largest acreage of the stands in the 15-25 year age class and the 75-125 year age classes.

Stand Composition

More than 50 percent of the basal area in pine with white pine (*Pinus strobus*) predominant.

Associated Species

White pine can be found growing in associations with most major tree species native to Wisconsin. It is a common to occasional associate in most of the major forest cover types. Within

the white pine forest type, the most common associates currently are: red pine (*Pinus resinosa*), jack pine (*Pinus banksiana*), aspen (*Populus* spp.), white birch (*Betula papyrifera*), red maple (*Acer rubrum*), red oak (*Quercus rubra*), northern pin oak (*Quercus ellipsoidalis*), black oak (*Quercus velutina*), white oak (*Quercus alba*), balsam fir (*Abies balsamea*), white spruce (*Picea glauca*), and eastern hemlock (*Tsuga canadensis*).

Soil Preference

White pine will grow on almost all soils within its range. It is often found on excessively drained sands. Although the relative growth potential is only moderate, it is one of the most productive and competitive species capable of growing on these droughty sites. Loamy sands and sandy loams (somewhat excessively to somewhat poorly drained) present the best opportunities for white pine management. Growth potentials are very good, and competition by mesic hardwoods is limited. White pine is very productive on well drained to somewhat poorly drained loams and silts, however hardwood competition on these sites makes regeneration difficult.

Range of Habitat Types

White pine, as a cover type and an associated species, was a more common component of northern and central Wisconsin forested landscapes in the pre-European settlement era than at present. Natural disturbance regimes, which created conditions conducive to white pine, have been severely altered. The historical cutover and fires that followed significantly reduced white pine occurrence. This resulted in a limited seed source, which has further restricted reestablishment. White pine was, and could become, a more important component on some habitat types than is suggested by current occurrence.

1. In northern Wisconsin, white pine currently is:
 - a. A minor associate and minor cover type, exhibits moderate to good growth potential, and is competitive on the very dry to dry (VD-D) habitat type group. Occurrence and growth potentials improve as available moisture and nutrients increase (*Pinus-Acer* series). Management opportunities are good.
 - b. A common associate and minor cover type, exhibits very good growth potential, and is competitive on the dry to dry-mesic (D-DM) habitat type group. Management opportunities are excellent.
 - c. A minor associate and minor cover type, exhibits very good growth potential, and is somewhat competitive on the dry-mesic (DM) habitat type group. Management opportunities are good.
 - d. A minor associate and rare cover type, exhibits excellent growth potential, but generally is not competitive on the mesic (M) habitat type group. Competition intensity from mesic hardwoods increases from moderate to severe as soil moisture and nutrients improve.
 - e. A minor associate and rare cover type, exhibits very good growth potential, but generally is not competitive on nutrient medium to rich sites (loamy and silty soils) within the mesic to wet-mesic (M-WM) habitat type group.
 - f. A common associate and minor cover type, exhibits very good growth potential, and is somewhat competitive on nutrient poor to medium sites (sandy and loamy soils) within the mesic to wet-mesic (M-WM) habitat type group. Example habitat types are ArAbVC and TMC. Management opportunities are good to excellent.

Northern Hardwoods Cover Type (1,899 Acres)

The Northern Hardwoods Cover Type is predominant on 5% of the Vilas County Forest covering 1,899 acres in 44 distinct stands. Northern hardwood stands are in an uneven aged state where many age classes are represented in each stand, thus stand ages are not tracked by age.

Stand Composition

Any combination of sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), basswood (*Tilia americana*), white ash (*Fraxinus americana*), and yellow birch (*Betula alleghaniensis*) comprises more than 50% of the basal area in sawtimber and poletimber stands or more than 50% of the stems in sapling and seedling stands. Sugar maple typically is the dominant species in northern hardwood stands in Wisconsin. Basswood is the most common associate of sugar maple, but only occasionally dominates. White ash and yellow birch are common minor associates, but only rarely dominate stands.

Associated Species

Within the northern hardwood cover type, the predominant associates in are (1996 FIA): red maple (*Acer rubrum*), red oak (*Quercus rubra*), hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), and balsam fir (*Abies balsamea*). Many other tree species occurring in Wisconsin can be found as occasional associates in northern hardwood stands.

Soil Preference

The northern hardwood cover type develops and grows best on mesic sites with well drained to moderately well drained loamy soils; the very best soils are deep, well drained, silt loams. However, it occurs on a wide range of soil conditions, from well drained to somewhat poorly drained and from sands to clays. Dry, excessively drained sands and wet, poorly drained soils generally do not support the development of northern hardwood stands. Soil pH can range from 3.7 to 7.3, but a pH between 5.5 and 7.3 is most common.

Range of Habitat Types

The northern hardwood cover type currently is much more common in northern than in southern Wisconsin. About 89% of sugar maple net growing stock volume occurred (1996 FIA) within the northern habitat type groups. For the other northern hardwoods, 96% of yellow birch volume, 77% of basswood volume, 69% of beech volume, and 58% of white/green ash volume occurred within the northern habitat type groups.

Northern Wisconsin Habitat Types

In northern Wisconsin, the occurrence and relative growth potential of the northern hardwood cover type, and of the individual species comprising the type, vary by habitat type groups and habitat types. The northern hardwood cover type currently is the predominant cover type occurring on mesic sites in northern Wisconsin. It is of common occurrence on the dry-mesic and the mesic to wet-mesic habitat type groups. It generally does not develop on the very dry to dry, dry to dry-mesic, and wet-mesic to wet groups.

Tamarack Cover Type (880 Acres)

The Tamarack Cover Type is predominant on 2% of the Vilas County Forest covering 880 acres in 35 distinct stands. Stand range from 1 year to 100 years of age with the largest acreage the stands in the 76-100 year age classes.

Stand Composition

More than 50 percent swamp conifers with tamarack (*Larix laricina*) predominant.

Associated Species

Black spruce (*Picea mariana*), white spruce (*P. glauca*), and northern white cedar (*Thuja occidentalis*). Tamarack is usually associated with lowland brush because it has a relatively thin crown that passes sufficient light to allow the brush layer to develop.

Soil Preference

Tamarack can tolerate a wide range of soil moisture conditions and soil textures. It is most commonly found on moist organic soils, peats and mucks of swamps and muskegs, especially in the southern limits of its range. Best growth is observed on rich, moist, but well-drained, loamy soils along streams, lakes and swamps; in seep areas; and on shallow layers of mulch or well-decomposed peat over mineral soil.

Range of Habitat Types

Habitat types for swamp conifers were determined for upper Michigan (Coffman et al., 1980) and include TTM (*Tsuga-Thuja-Mitella*), TTS (*Tsuga-Thuja-Sphagnum*), PO (*Picea-Osmunda*), and PCS (*Picea-Chamadaphne-Sphagnum*). However, these types are based on very limited sampling and have not been adequately studied to offer useful management information.

White Cedar Cover Type (175 Acres)

The White Cedar Cover Type is predominant on less than 1% of the Vilas County Forest covering 175 acres in 11 distinct stands. Stand range from 51 years to 164 years of age with the largest acreage of stands in the 91-105 year age classes.

Stand Composition

More than 50 percent swamp conifers with northern white cedar (*Thuja occidentalis*) predominant.

Associated species

Black spruce (*Picea mariana*), white spruce (*P. glauca*), tamarack (*Larix laricina*), balsam fir (*Abies balsamea*), eastern hemlock (*Tsuga canadensis*), black ash (*Fraxinus nigra*), red maple (*Acer rubrum*), yellow birch (*Betula allegheniensis*), paper birch (*B. papyrifera*), American elm (*Ulmus americana*), and quaking aspen (*Populus tremuloides*).

Soil Preference

Best growth occurs on neutral or alkaline mineral soils of limestone origin. In swamps, the site quality for cedar increases as the internal drainage improves and the depth of peat decreases. However, the composition of the organic material is more important than its depth. Peat comprised of moderately to well decomposed woody plants or sedges is preferred by white cedar.

Range of Habitat Types

Habitat types for swamp conifers were determined for upper Michigan (Coffman et al., 1980) and include TTM (Tsuga-Thuja-Mitella), TTS (Tsuga-Thuja-Sphagnum), PO (Picea-Osmunda), and PCS (Picea-Chamadaphne-Sphagnum). However, these types are based on very limited sampling and have not been adequately studied to offer useful management information.

Balsam Fir Cover Type (162 Acres)

The Balsam Fir Cover Type is predominant on less than 1% of the Vilas County Forest covering 162 acres in 12 distinct stands. Stand range from 21 years to 95 years of age with the largest acreage of stands in the 21-40 year age classes.

Stand Composition

More than 50 percent balsam fir (*Abies balsamea*)

Associated species

White spruce (*Picea glauca*), Paper birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*), red maple (*Acer rubrum*), white cedar (*Thuja occidentalis*), black spruce (*Picea mariana*), hemlock (*Tsuga canadensis*), red pine (*Pinus resinosa*), white pine (*P. strobus*), jack pine (*P. banksiana*), and other species found among northern hardwoods and swamp hardwoods.

Soil Preferences

Loamy soils are preferred but the type also does well on sand-based soils. Balsam fir grows on a wide variety of soils but generally does best on loams. It grows on gravelly sands and in peat swamps. White spruce grows on a variety of soils of glacial, lacustrine, marine, or alluvial origin. Over its geographic range, soils vary from heavy clays to sandy podzols. White spruce is exacting in its nutrient requirements and tends to show symptoms of potassium deficiency on poor soils.

Range of Habitat Types

In northern Wisconsin this type is common on TMC, ArC, AArS, and AASM. It is a minor cover type on AQT, QAE, AQV, PMV, ATM, AC, and AAr (Kotar et al., 1988) .

White (Paper) Birch Cover Type (97Acres)

The White Birch Cover Type is predominant on less than 1% of the Vilas County Forest covering 97 acres in 4 distinct stands. Stand range from 91 years to 100 years of age with the largest acreage of stands in the 96-100 year age classes

Stand Composition

Paper birch (*Betula papyrifera*) comprises 50% or more of the basal area in sawtimber and

poletimber stands, or 50% or more of the stems in sapling and seedling stands.

Associated Species

The most common associates are aspen (*Populus* spp.) and red maple (*Acer rubrum*). Other common associates include: red oak (*Quercus rubra*), white oak (*Quercus alba*), balsam fir (*Abies balsamea*), white pine (*Pinus strobus*), red pine (*Pinus resinosa*), white cedar (*Thuja occidentalis*), and sugar maple (*Acer saccharum*). Many other species occur as occasional associates.

Soil Preference

Paper birch grows on a wide range of soils, across most textural and drainage classes. In general, best development and growth occurs on loamy soils that are well to moderately well-drained. Comparatively poor development and growth are exhibited on dry (excessively drained) and wet (poorly drained) sites.

Range of Habitat Types

In northern Wisconsin, the occurrence and relative growth potential of the paper birch cover type varies by habitat type groups and habitat types. The paper birch cover type is a common cover type on all northern habitat type groups, representing 2-6% of group acres, and 1-9% of group volume.

- Approximately 37% of paper birch cover type acres occur on mesic to wet-mesic sites; 20% on dry-mesic; 12-13% on dry to dry-mesic, mesic, and wet-mesic to wet; and 7% on very dry to dry sites.

Red Maple Cover Type (67Acres)

The Red Maple Cover Type is predominant on less than 1% of the Vilas County Forest covering 67 acres in 4 distinct stands. Stand range from 16 years to 105 years of age with the largest acreage of stands in the 91-105 year age classes

Stand Composition

Red maple comprises 50% or more of the basal area in pole timber and sawtimber stands, or 50% or more of the stems in seedling and sapling stands.

Associated Species

Red maple is associated with more than 70 different commercial tree species. It's more common associates include balsam fir (*Abies balsamea*), white pine (*Pinus strobus*), sugar maple, beech (*Fagus grandifolia*), yellow birch, paper birch (*Betula papyrifera*), eastern hemlock (*Tsuga canadensis*), eastern hophornbeam (*Ostrya virginiana*), northern white cedar (*Thuja occidentalis*), aspen (*Populus grandidentata* and *P. tremuloides*), black ash (*Fraxinus nigra*), pin cherry (*Prunus pensylvanica*), black cherry (*P. serotina*), northern red oak (*Quercus rubra*), American elm, silver maple (*Acer saccharinum*), and swamp white oak (*Quercus bicolor*). (Burns & Honkala 1990)

Soil Preference

Red maple can probably thrive on a wider range of soil types, textures, moisture, pH, and

elevation than any other forest species in North America. The red maple type occurs on a wide range of soil conditions, from sand to clay and from dry to wet. It grows on both glaciated and nonglaciated soils derived from granite, gneisses, schists, sandstone, shales, slates, conglomerates, quartzites, and limestone. Best growth is demonstrated on mesic to wet mesic sites with loamy or sandy loam soils but growth potential is good for many sites except for excessively dry or poorly drained. Higher site indices are noted on soils that have an accumulation of fine textured soils (Haag et al. 1989). Red maple trees develop a greater vertical rooting structure (root fan) in this soil type capitalizing on additional water and nutrients.

Abundance and Range of Habitat Types

Red maple has become nearly ubiquitous across sites with varying moisture and nutrient regime being dubbed a “super generalist”. In Wisconsin, it is commonly found across the state in nearly every habitat with varying trends in density. This distribution is in contrast to pre-European settlement where red maple existed mainly in poorly drained areas. Recognition of red maple as a separate cover type generally is attributed to disturbances that release red maple advance regeneration and residuals which may respond rapidly. Dramatic increases in current red maple distribution can be attributed to establishment following a variety of disturbances such as land clearing, fire suppression, windthrow, and insect/disease outbreaks (Abrams 1988). The decline of American elm (*Ulmus Americana*) as a result of Dutch elm disease and the selective removal of northern red oak (*Quercus rubra*), yellow birch (*Betula alleghaniensis*), quaking aspen (*Populus tremuloides*), and sugar maple (*Acer saccharum*) have also contributed to increasing the proportion of red maple stocking in many stands.

White Spruce Cover Type (60Acres)

The White Spruce Cover Type is predominant on less than 1% of the Vilas County Forest covering 60 acres in 5 distinct stands. Stand range from 21 years to 95 years of age with the largest acreage of stands in the 21-25 years and 91-95 years age classes

Stand Composition

More than 50 percent white spruce (*Picea glauca*)

Associated species

Balsam fir (*Abies balsamea*), Paper birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*), red maple (*Acer rubrum*), white cedar (*Thuja occidentalis*), black spruce (*Picea mariana*), hemlock (*Tsuga canadensis*), red pine (*Pinus resinosa*), white pine (*P. strobus*), jack pine (*P. banksiana*), and other species found among northern hardwoods and swamp hardwoods.

Soil Preferences

Loamy soils are preferred but the type also does well on sand-based soils. Balsam fir grows on a wide variety of soils but generally does best on loams. It grows on gravelly sands and in peat swamps. White spruce grows on a variety of soils of glacial, lacustrine, marine, or alluvial origin. Over its geographic range, soils vary from heavy clays to sandy podzols. White spruce is exacting in its nutrient requirements and tends to show symptoms of potassium deficiency on poor soils.

Range of Habitat Types

In northern Wisconsin this type is common on TMC, ArC, AArS, and AASM. It is a minor cover type on AQT, QAE, AQV, PMV, ATM, AC, and AAr (Kotar et al., 1988)

Scrub Oak Cover Type (38 Acres)

The Scrub Oak Cover Type is predominant less than 1% of the Vilas County Forest covering 38 Acres in 2 distinct stands. Stand range from 1 year to 5 years or age. These stands are growing on sites not suitable for production of quality oak, including extremely drained sand soils with limited nutrient content.

Stand Composition:

Oak comprises 50% or more of the basal area in poletimber and sawtimber stands, or 50% or more of the stems in seedling and sapling stands. In Vilas County the common upland oak species are: northern pin oak (*Q. ellipsoidalis*), black oak (*Q. velutina*), and northern red oak (*Quercus rubra*)

Soil Preference

Northern Dry (very dry to dry and dry to dry-mesic habitat type groups)

Hemlock Cover Type Type (30 Acres)

The Hemlock Cover Type is predominant less than 1% of the Vilas County Forest covering 30 Acres in 3 distinct stands. Stand range from 91 year to 100 years or age.

Stand Composition

More than 50 percent Eastern Hemlock (*Tsuga canadensis*), with yellow birch (*Betula allegheniensis*), eastern white pine (*Pinus strobus*), and sugar maple (*Acer saccharum*).

Associated Species

Northern red oak (*Quercus rubra*), red maple (*A. rubrum*), basswood (*Tilia americana*), white ash (*Fraxinus americana*), northern white cedar (*Thuja occidentalis*), paper birch (*B. papyrifera*), and balsam fir (*Abies balsamea*).

Soil Preference

The soil criteria for hemlock are not exacting but typically are moist and well-drained. Preferred soil types include upland sandy loams, loamy sands, loams, and silt loams. Preferred soil types for yellow birch are loams and shallow silt loams.

Range of Habitat Types

TMC (*Tsuga/Maianthemum-Coptis*) medium ATM (*Acer-Tsuga/Maianthemum*) | ATD (*Acer-Tsuga/Dryopteris*) | AFD (*Acer-Fagus/Dryopteris*) | AViO (*Acer/Viola-Osmorhiza*) | AH (*Acer/Hydrophyllum*) rich

Swamp Conifer Cover Type (30Acres)

The Swamp Conifer Cover Type is predominant on less than 1% of the Vilas County Forest covering 30 acres in 2 distinct stands. Stand range from 96 years to 115 years of age.

Stand Composition

More than 50 percent swamp conifers including balsam fir (*Abies balsamea*), Northern white cedar (*Thuja occidentalis*), black spruce (*Picea mariana*), white spruce (*P. glauca*), tamarack (*Larix laricina*), with none of these individual species composing more than 49% of the stand.

Associated Species

Hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), jack pine (*Pinus banksiana*), black ash (*Fraxinus nigra*), paper birch (*Betula papyrifera*), yellow birch (*B. allegheniensis*), red maple (*Acer rubrum*), quaking aspen (*Populus tremuloides*) and balsam poplar (*P. balsamifera*).

Soil Preference

Located on peat or muck soils where soil pH is in the range of 4 to 6.

Range of Habitat Types

Hydric (wet) site habitat types have not been developed for Wisconsin. Habitat types for swamp conifers were determined for upper Michigan (Coffman et al., 1980) and include TTM (*Tsuga-Thuja-Mitella*), TTS (*Tsuga-Thuja-Sphagnum*), PO (*Picea-Osmunda*), and PCS (*Picea-Chamadaphne-Sphagnum*). However, these types are based on very limited sampling and have not been studied adequately to offer extensive management information.

Miscellaneous Coniferous Cover Type (21Acres)

The Miscellaneous Coniferous Cover Type is predominant less than 1% of the Vilas County Forest covering 21 Acres in 1 distinct stands. This stand is 94 years of age.

Stand Composition

Miscellaneous conifer type includes stand which have pine or spruce types which comprise 50% or more of the basal area in sawtimber and pole timber stands. This type is commonly utilized for areas which include uncommon species which have been introduced into an area in plantations such as Scotch pine (*Pinus sylvestris*), Norway spruce, (*Picea abies*) or Colorado Blue Spruce (*Picea pungens*). This type may also be utilized when no individual species is the dominant type within a stand and it cannot be determined what the future dominance will be. On the Vilas County Forest, this type is utilized for Norway Spruce plantations which were historically planted.

Associated Species

Most stands are fairly pure plantations with few associates.

Soil Preference

This cover type is most common on dry (excessively to somewhat excessively drained), nutrient poor to medium. Productivity can be good to excellent on many of these soils,

but is only fair on the driest, most nutrient poor sands. Examples of soil characteristics that improve productivity (increase moisture and nutrient availability) are: finer textures (loamy sands), the presence of finer textured lenses or layers, underlying deposits (e.g. sand outwash over sandy loam till), and the presence of a water table at a depth of 4-9 feet.

Swamp Hardwood Cover Type (15 Acres)

The Swamp Hardwoods Cover Type is predominant less than 1% of the Vilas County Forest covering 15 Acres in 2 distinct stands. This stands are 91 and 145 years of age.

Stand Composition

Any combination of black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), swamp white oak (*Quercus bicolor*), and elms (*Ulmus* spp.) comprises 50% or more of the basal area in sawtimber and poletimber stands, or 50% or more of the stems in sapling and seedling stands.

Associated Species

aspen (*Populus* spp.), white birch (*Betula papyrifera*), yellow birch (*Betula alleghaniensis*), balsam fir (*Abies balsamea*), northern white cedar (*Thuja occidentalis*), hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), white spruce (*Picea glauca*), black spruce (*Picea mariana*), and tamarack (*Larix laricina*). Differences in species composition are dependent on variation in site, soils and duration of high water.

Soil Preference

The swamp hardwood cover type occurs on forested wetlands (swamps) characterized by periodic inundation (fluctuating water table near or above the soil surface) and nearly permanent subsurface water flow. Seasonal and yearly fluctuations in depth of saturation can be considerable. Soils are poorly drained to very poorly drained and are subject to ponding. These soils commonly have a “depth to water table” of zero inches and can occur in basins, depressions, flats, and drainage ways. Typical soils are mucks of highly variable thickness (several inches to several feet) over mineral soil of any texture. In some cases, the surface can be mucky mineral soil, and other soils may include mucky peat. Nutrient availability can be highly variable among sites, and has a strong influence on community development and potential productivity. Nutrient availability is influenced by type of substrate, degree of decomposition of organic materials, run-off from adjacent stands and groundwater flow. In general, growth and productivity are improved by: mineral soil of finer texture closer to the surface; greater decomposition of organic materials; better drainage; flowing and aerated water; and adjacent landform/soils. Although swamp hardwoods, particularly black ash, can tolerate semi-stagnate water flow and relatively nutrient poor conditions, the type does not generally develop on nutrient poor, acid peatlands (dysic histosols)

Abundance and Range of Habitat Types

As defined here, forested wetlands generally occur on poorly drained to very poorly drained soils (as classified by NRCS). The substrate can be mineral or organic, and is influenced by a fluctuating water table or periodic flooding. Seasonal and yearly fluctuations in depth of

saturation can be considerable. Nutrient availability can be highly variable among sites, and has a strong influence on community development, growth and productivity, and habitat type classification. Forested wetland ecosystems comprise about 2,670,000 acres or 17% of Wisconsin's forest

300.2.6 NON-FORESTED COMMUNITIES AND COVER TYPES

Non-forested habitats are important components of management within the County Forest. Upland and lowland which do not produce trees of merchantable value, provide important habitat for distinct groups of species, provide ecosystem services and protect the environment. Areas of human development provide for recreational and other uses for people on the public lands.

Non-Forest areas of the County Forest include:

Vilas County Forest Breakdown Non-Forest Cover Type Acreage Non-Forested Lands- 2020				
Forest Code	Forest Type Description	# of Stands	Acres	Type percent of non-forested acres
UB	Upland- Brush	6	63	1.33%
GG	Upland- Grass	2	12	0.25%
GH	Upland- Herbaceous Vegetation	15	123	2.60%
GLS	Upland- Low Growing Shrubs	21	271	5.74%
KB	Marsh-Muskeg-Bog	27	1079	22.85%
KEV	Marsh- Emergent Vegetation	2	63	1.33%
KG	Marsh- Lowland Grass	2	26	0.55%
KH	Marsh- Lowland herbaceous vegetation	0	0	0.00%
LBA	Lowland Brush- Alder	29	1635	34.62%
LM	Minor Lake or Pond	25	483	10.23%
LMS	Minor Stream	17	233	4.93%
ROW	Right of Way	35	703	14.88%
Z	Rock Outcrops-Sand Dunes	0	0	0.00%
IP	Improvements-Parks	7	31	0.66%
IC	Improvements- Campground	0	0	0.00%
IGP	Improvements- Gravel Pit	0	0	0.00%
		0	0	0.00%
		0	0	0.00%
		0	0	0.00%
Totals		189	4723	

Description of Non-Forested Cover Types of the Vilas County Forest:

Upland Brush (UB) Cover Type (63 Acres)

The Upland Brush Cover Type is predominant on 63 Acres in 6 distinct areas.

Definition

Upland sites less than 10% stocked with tree species but having 50% or more of the area stocked with taller growing, persistent shrubs. Includes but is not limited to, shrubs such as hazel, gray dogwood, junberry, sumac, ninebark, prickly ash, etc.

Upland Grass (GG) Cover Type (12 Acres)

The Upland Grass Cover Type is predominant on 12 Acres in 2 distinct areas.

Definition

Upland areas, including abandoned fields, less than 10% stocked with tree species, and Ground cover consisting predominately of non-native grasses such as brome, quack, blue grass, timothy, etc.

Upland Herbaceous Vegetation (GH) Cover Type (123 Acres)

The Upland Herbaceous Vegetation Cover Type is predominant on 123 Acres in 15 distinct areas.

Definition

Upland areas, including abandoned fields, less than 10% stocked with tree species, and Ground cover consisting predominately herbaceous vegetation species such as bracken fern, sweet clover, giant ragweed, stinging nettle, upland aster, goldenrod, prairie dock, etc.

Upland Low Growing Shrubs (GLS) Cover Type (271 Acres)

The Upland Low Growing Shrubs Cover Type is predominant on 271 Acres in 21 distinct areas.

Definition

Upland areas, including abandoned fields, less than 10% stocked with tree species, and Ground cover consisting predominately low growing woody plants such as blueberry, raspberry, etc.

Marsh- Muskeg Bog (KB) Cover Type (1079 Acres)

The Marsh Muskeg Cover Type is predominant on 1079 Acres in 27 distinct areas.

Definition

Wet lowland areas, less than 10% stocked with tree species and ground cover consisting predominantly of bog plants such as sphagnum moss, cotton grass, leatherleaf, cranberry, Labrador tea, etc.

Marsh- Emergent Vegetation (KEV) Cover Type (63 Acres)

The Marsh Emergent Vegetation Cover Type is predominant on 63 Acres in 2 distinct areas.

Definition

Wet lowland areas, less than 10% stocked with tree species and ground cover consisting predominantly of coarse emergent marsh vegetation such as cattails, river bulrush, tall sedges, etc.

Marsh- Lowland Grass (KG) Cover Type (26 Acres)

The Marsh Lowland Grass Cover Type is predominant on 26 Acres in 2 distinct areas.

Definition

Wet lowland areas, less than 10% stocked with tree species and ground cover consisting predominantly of more than 50% of true grasses such as canary grass, bluejoint, redtop, cordgrass, big bluestem, fire stemmed sedges, etc.

Lowland Brush- Alder (LBA) Cover Type (1635 Acres)

The Lowland Brush- Alder Cover Type is predominant on 1635 Acres in 29 distinct areas.

Definition

Wet lowland brush areas, less than 10% stocked with tree species and ground cover more than 50% alder

Minor Lakes or Ponds (LM) Cover Type (483 Acres)

Minor Lakes or Ponds are predominant on 483 Acres in 25 distinct areas.

Definition

Lakes, ponds and flowages less than 40 acres in area

Minor Streams (LMS) Cover Type (233 Acres)

Minor Streams are predominant on 233 Acres in 17 distinct areas.

Definition

Streams less than 1/8 mile in width

Right of Way (ROW) Cover Type (703 Acres)

Right of Ways are predominant on 703 Acres in 35 distinct areas.

Definition

These areas are impacted by human uses which include improved roads, railroads or right-of-way for gas, power or telephone lines.

Improvement- Parks (IP) Cover Type (31 Acres)

Park use areas are predominant on 31 Acres in 7 distinct areas.

Definition

These areas are impacted by human uses which include areas developed for picnic areas or day use areas. These areas are designated as a special use area with parks as the priority use as allowed under the Wisconsin County Forest Law.

Improvement- Campgrounds (IC) Cover Type (0 Acres)

Campground areas are predominant on ____ Acres in ____ distinct areas. To date no areas have been designated.

Definition

These areas are impacted by human uses which include areas developed for overnight camping. These areas are designated as a special use area with campgrounds as the priority use as allowed under the Wisconsin County Forest Law.

Improvement- Gravel Pit (IGP) Cover Type (0 Acres)

Campground areas are predominant on ____ Acres in ____ distinct areas. To date no areas have been designated.

Definition

These areas are impacted by human uses which include areas developed for extraction of road gravel and fill to meet County Forest needs.

Recreation Overlay Management Districts

Overlay management districts are areas that are not identified independently as a cover type but include areas within designated forest management areas that have recreational trail use dispersed within forest management areas. All areas within ¼ mile of established trails are designated as overlay districts and where possible, forest management activity or trail location or use in these areas may be modified during harvesting activity to reduce conflict and improve safety.

Overlay- Winter Motorized Trails (OWMT) (0 Acres)

Winter motorized trail areas affect or influence management on ____ Acres in ____ distinct forest stands. To date no areas have been officially designated.

Definition

These areas are impacted by human uses which include areas developed for winter motorized recreational trails such as snowmobile trails. Under the Wisconsin County Forest Law, these areas are required have forest management as a priority, however the motorized use of the forest is allowed when compatible with forest management. When not precluded by other factors, forest

management or trail location or use in these areas may be modified from November 15th through April 15th of the following year. Dates of modification will be dependent upon harvest activity, amount of recreational use and alternatives available.

Overlay- Winter Non-Motorized Trails (OWNMT) (0 Acres)

Winter non-motorized trail areas affect or influence management on ____ Acres in ____ distinct forest stands. To date no areas have been officially designated.

Definition

These areas are impacted by human uses which include areas developed for non-motorized recreational trails such as cross-country ski trails and snowshoe trails which are developed and maintained. Under the Wisconsin County Forest Law, these areas are required have forest management as a priority, however the non-motorized use of the forest is allowed when compatible with forest management. When not precluded by other factors, forest management or trail location or use in these areas may be modified from November 15th through April 15th of the following year. Dates of modification will be dependent upon harvest activity, amount of recreational use and alternatives available.

Overlay- Summer Motorized Trails (OSMT) Overlay (0 Acres)

Summer non-motorized trail areas affect or influence management on ____ Acres in ____ distinct forest stands. To date no areas have been officially designated.

Definition

These areas are impacted by human uses which include areas developed for summer motorized recreational trails such as all terrain vehicles (ATV and UTV) and Off Highway Motorcycle (OHM) trails. Under the Wisconsin County Forest Law, these areas are required have forest management as a priority, however the motorized use of the forest is allowed when compatible with forest management. When not precluded by other factors, forest management or trail location or use in these areas may be modified from April 15th through November 15th. Dates of modification will be dependent upon harvest activity, amount of recreational use and alternatives available.

Overlay- Summer Non Motorized Trails (OSNMT) Overlay (0 Acres)

Summer non-motorized trail areas affect or influence management on ____ Acres in ____ distinct forest stands. To date no areas have been officially designated.

Definition

These areas are impacted by human uses which include areas developed for summer non-motorized recreational trails such as hunter walking trails, hiking, biking and water based trails.

Under the Wisconsin County Forest Law, these areas are required have forest management as a priority, however the motorized use of the forest is allowed when compatible with forest management. When not precluded by other factors, forest management or trail location or trail use in these areas may be modified from April 15th through November 15th. Dates of modification will be dependent upon harvest activity, amount of recreational use and alternatives available.

300.2.6 Wildlife and Fish

Wisconsin supports over 650 different types of mammals, birds, reptiles, amphibians and fish as well as millions of invertebrates. Management of county forest lands and the biotic communities they support provide a mix of habitat types and ages for a wide range of wildlife species. Each species, or interacting group of species, do best under different conditions. County forest lands provide a full range of habitats from open grasslands/barrens to mature forests, from bogs to forested wetlands, from spring ponds to lake shorelines. County forest staffs work closely with WDNR fish and wildlife managers and conservation organizations to identify and manage critical habitat for breeding, migrating and wintering fish and wildlife.

WILDLIFE

Credit to the following refence for much of the information in this section: Wisconsin Department of Natural Resources. 2015. The ecological landscapes of Wisconsin: An assessment of ecological resources and a guide to planning sustainable management. Chapter 14, Northern Highland Ecological Landscape. Wisconsin Department of Natural Resources, PUB-SS1131P 2015, Madison.

The Vilas County Forest contains important wildlife species associated with the high density of kettle lakes, pine-dominated dry and dry-mesic forest communities, forested and nonforested acid peatlands, wild rice marshes, sedge meadows, mixed mesic hardwood-conifer forests, headwaters of major streams, and forested watersheds. The forest supports and has high potential to continue supporting wide-ranging mammals, forest interior songbirds and raptors, species that use lake, stream, and shoreline habitats, conifer specialists (especially those associated with forests of pine, eastern hemlock, spruce, and balsam fir), peatland specialists, and certain marsh species.

There is potential for large block management for forest interior species here since the forest is only moderately fragmented, and it is possible to maintain or create forested connections to other public lands.

Because of the abundant aquatic resources, Vilas County supports significant populations of water-dependent wildlife species, such as Common Loon, Osprey, Bald Eagle, Black Tern, and North American river otter. All fish, amphibians, many invertebrates, and aquatic plants also depend on lake and stream habitats. The lakes and streams are also important for nesting Mallard, American Black Duck, Ring-necked Duck, and Wood Duck populations.

A large number of rare aquatic animals reflects the abundance of high-quality lakes, streams, and wetlands in Vilas County as well as the generally good condition of most watersheds here (which are mostly forested). Aquatic environments are highly significant to several rare dragonflies, for example, the mottled darner (, the lake emerald, and the Wisconsin Threatened pygmy snaketail.

One of two Wisconsin locations for the globally rare robust Dubiraphian riffle beetle is associated with the predominant ecological landscape of the County forest.

Management Practices:

Aquatic environments and habitats will be maintained under this plan by required utilization of Wisconsin's Best Management Practices for all forest management and recreational development and use activity. Appropriate maintenance and perpetuation projects on these non-forested areas may be completed as funding, staffing, and partnerships become available.

Lakeshore marshes support a small breeding population of the Trumpeter Swan as well as populations of American Black Duck, American Bittern, Black Tern, and the American bullfrog. Throughout the area, lakes containing wild rice beds are important for breeding and migratory waterfowl and other water birds.

Management Practices:

Lakeshore marsh habitats will be maintained under this plan using exclusion of activity to provide for natural actions to prevail. Appropriate maintenance and perpetuation projects on these non-forested areas may be completed as funding, staffing, and partnerships become available.

Large sedge meadows and open bog/poor fen habitats support Yellow Rail, Northern Harrier, Nelson's Sparrow, Le Conte's Sparrow, and the southern bog lemming.

Management Practices:

Existing sedge meadow habitats will be maintained under this plan using exclusion of activity to provide for natural actions to prevail. Appropriate maintenance and perpetuation projects on these non-forested areas may be completed as funding, staffing, and partnerships become available.

Black spruce, tamarack, and northern white-cedar swamps and non-forested peatland communities support a broad array of animals that are strongly associated with North America's boreal regions. Spruce Grouse, Northern Saw-whet Owl, Gray Jay, Boreal Chickadee, Cape May Warbler, Connecticut Warbler, Red Crossbill, and Evening Grosbeak may be found in these communities. It should be noted that many of these species require special consideration under National Heritage Inventory protocol.

Management Practices:

Maintaining the black spruce, tamarack and northern white-cedar swamps will be a component of this plan with provisions to manage and perpetuate habitats of species on the NHI listing. These habitats will be perpetuated utilizing standard commercial forestry practices with goals to maximize timber revenue while providing wildlife considerations within management activities performed. Wildlife considerations may include harvest scheduling and green tree, patch, snag, den, and woody debris retention guidelines.

Existing non-forested peatland habitats will be maintained under this plan using exclusion of activity to provide for natural actions to prevail. Appropriate maintenance and perpetuation projects on these non-forested areas may be completed as funding, staffing, and partnerships become available.

In more open peatlands (Muskeg, Poor Fen, Open Bog), rare boreal lepidoptera such as the freija fritillary (*Boloria freija*) and frigga fritillary (*Boloria frigga*) have been documented, and there is high potential for additional discoveries of rare species with boreal habitat affinities.

Management Practices:

Existing open peatland habitats will be maintained under this plan using exclusion of activity to provide for natural actions to prevail. Appropriate maintenance and perpetuation projects on these non-forested may be completed as funding, staffing, and partnerships become available.

Shrub swamp habitats are widespread and provide important habitat for species of management concern such as the Golden-winged Warbler, American Woodcock, Veery, wood turtle, and snowshoe hare.

Management Practices:

Existing swamp shrub habitats will be maintained under this plan using exclusion of activity to provide for natural actions to prevail. Appropriate maintenance and perpetuation projects may be completed as funding, staffing, and partnerships become available.

Upland “shrub” habitats such as Bracken Grassland or cutovers are significant to Chestnut-sided Warbler, Mourning Warbler, and Brown Thrasher.

Management Practices:

Existing upland shrub habitats will be maintained and perpetuated under this plan. Appropriate maintenance and perpetuation projects on these non-forested may be completed as funding, staffing, and partnerships become available.

This Vilas County Forest has major potential for jack pine, red and eastern white pine management on dry to dry-mesic sites, a mix of conifer and hardwood forests on more mesic sites, and for all of the species that use these habitats. Jack pine, are the second largest forest type, and provide habitat for rare species including the Kirtland’s Warbler that was recently delisted as a Federally Protected species.

Management Practices:

Maintaining the jack pine, red pine, and eastern white pine components on dry to dry-mesic sites

will be a component of this plan with provisions to increase diversity within small patches scattered throughout these stands. These habitats will be perpetuated utilizing standard commercial forestry practices with goals to maximize timber revenue while providing wildlife considerations within management activities performed. Wildlife considerations may include harvest scheduling and green tree, patch, snag, den, and woody debris retention guidelines .

The forest provides opportunity to provide secure habitat for a large number of forest interior, area-sensitive animals, such as the fisher and American black bear. Forest interior bird species, including neotropical migrant songbirds such as wood warblers, northern finches, vireos, flycatchers, and thrushes; conifer specialists, such as Boreal Chickadee, Gray Jay, Connecticut Warbler, Swainson's Thrush, Evening Grosbeak. Forest raptors such as the Northern Goshawk and Red-shouldered Hawk have a high probability of being located within the Vilas County Forest. Some of these species are considered Wisconsin Species of Special Concern, Threatened or Endangered.

Management Practices:

Maintaining or restoring large blocks of unfragmented forest and increasing the coniferous component of these forests will be necessary to maintain these species and will be a consideration in this management plan. Maintaining and restoring large blocks of unfragmented forest will be a component of this plan. These habitats will be perpetuated through designation of interior forest management areas of various sizes that may preclude development of recreational sites and motorized access by the public and motorized user groups during critical times of the year. These habitats will be perpetuated utilizing standard commercial forestry practices with goals to maximize timber revenue while providing wildlife considerations within management activities performed. Wildlife considerations may include harvest scheduling and green tree, patch, snag, den, and woody debris retention guidelines. Increases in coniferous components will be accomplished utilizing standard commercial forestry practices to retain, maintain, or increase conifer components which are lacking within specific areas. Programming will be developed within designated interior forest areas to promote and assist with forest management on private properties under the "working forest protection program" as funding, staffing, and partnerships become available.

Some of the highest nesting densities of Northern Goshawks in the state occur in Vilas County. Currently, aspen forests are abundant, and these habitats are important for species that utilize dense deciduous saplings and young deciduous forest as habitat, such as white-tailed deer, Ruffed Grouse, American Woodcock, Chestnut-sided Warbler, and Golden-winged Warbler. .

Management Practices:

Maintaining and managing aspen composition and structure to meet the needs of young forest habitat specialist within the forest will be a consideration in this management plan. These habitats will be perpetuated utilizing standard commercial forestry practices with goals to maximize timber revenue while providing wildlife considerations within management activities performed. Wildlife considerations may include harvest scheduling and green tree, patch, snag,

den, and woody debris retention guidelines.

Socially Important Wildlife

Wildlife species such as White-tailed Deer, Black Bear, Beaver, River Otter, Fisher, Ruffed Grouse, American Woodcock, Wild Turkey, Mallard, Wood Duck, and Ringed-necked Duck are important for hunting, trapping, and wildlife viewing on the Vilas County Forest. These forest uses are important to the tourism economy of Vilas County.

Future forest management strategies or programs on the Vilas County Forest will emphasize management to maintain and improve habitat for socially important wildlife species because of the local significance for hunters and their positive impacts to the tourism economy of Vilas County. Consideration will be given to establishing partnerships with groups including the Ruffed Grouse Society, the National Wild Turkey Federation and the Young Forest Initiative to extend wildlife management alternatives and practices across the forest.

Examples of these strategies and programs will include:

The aspen and oak forest types are recognized as key habitat for White-tailed deer. Swamp conifer types such as northern white cedar and hemlock cover types provide critical winter thermal cover for deer yards. Under this plan, forest management activity will promote improvement of aspen and oak types with priority given to retention of oak on the landscape to benefit mast production for White-tailed deer. Retention and improvement of deer yarding areas will also be promoted.

Aspen forest types with 5 age classes located within close proximity are key habitat components for Ruffed grouse. The aspen cover type includes the largest acreage of the Vilas County Forest however this type has a relatively narrow age structure across the forest. Under this plan, forest management activity will promote management of aspen type age structures to benefit Ruffed grouse.

Permanent grassy openings within the forest, many originating from old log landings, camps, old farms, or frost pockets are vital components of forest wildlife habitat. Under this management plan the quality and quantity of permanent grassy openings will be maintained and improved to benefit all wildlife. This will be completed by active management including planting, mowing and/or herbicide treatments to maintain the openings.

FISH

Fishery resources are an important recreational use within Vilas County. Current and future management strategies or programs will emphasize management of water quality to maintain and improve fish habitat. This plan will also provide opportunities for establishment and maintenance of lake accesses for fishermen and women for the positive impacts to the tourism economy of

Vilas County.

Within the County Forest boundaries there is a variety of fishery resources. Approximately 39 named and 16 unnamed lakes have all or portions of their shorelines under county ownership. In addition, the county owns frontage on over 11 named cold-water streams. Under this management plan the quality of lakes, ponds and streams will be maintained and improved to benefit all fish species.

The lakes are an important warmwater fishery which support populations of muskellunge, walleye, northern pike, smallmouth bass, and largemouth bass in addition to bluegill, yellow perch, black crappie, long eared sunfish, and other panfish sought by anglers. The cold-water streams support populations of native brook trout (*Salvelinus fontinalis*) in addition to many species of rough fish, forage fish and minnows.

Under this management plan the quality of lakes, ponds and streams will be maintained and improved to benefit all fish species by utilization of management practices which follow Best Management Practices for Water Quality and by maintenance and creation of properly designed recreational facilities for water accesses.

Forest Planning and Management Considerations for Wildlife and Fish

Forest Fragmentation and Human Development Impacts

Increased residential development and recreational development in the forest, along with population growth and associated development appear likely to limit some forest and wildlife management options in the future. The ability to manage at large scales, maintaining ecosystem connectivity, and protecting important spawning, nesting, and foraging habitats will be more limited in the future due to these factors.

When large forest blocks are broken up by development or recreational uses, habitat fragmentation often results, limiting management options.

Development of seasonal and permanent homes, along with development and maintenance roads and other infrastructure to service the residents, increases habitat fragmentation and reduces the size of formerly connected habitats.

Protecting the integrity of the forest habitats through planning of recreation development and control of infrastructure development across the County forest lands are important wildlife management concerns within the County forest. Consideration of fragmentation will be implemented into this plan and all proposed development or permitting will have forest fragmentation as a discussion prior to land use designation changes by committee or prior to permitting for development projects.

Wildlife and Invasive Species Impacts

On the County Forest, excessive white-tailed deer herbivory can suppress or eliminate the regeneration of trees such as eastern hemlock and northern white-cedar and reduce populations of sensitive understory plants, including native plants in the lily and orchid families. Deer herbivory also limits ingrowth of red oak and northern hardwood species, increasing the regeneration and success of conifer species, resulting in simplification of forest species diversity. The winter feeding of white-tailed deer can lead to increased overwinter white-tailed deer survival, larger white-tailed deer populations than habitats can sustain, and ultimately, serious habitat damage.

Participation in the Wisconsin Deer Management Assistance Program (DMAP) and Wisconsin Wildlife Damage Program on the County Forest could provide opportunities to improve deer habitat and reduce damage to the forest.

Aquatic and terrestrial invasive species populations are present on the County forest, but most are not yet abundant enough to cause serious problems. Inventory and control of invasive species on the County forest will be most effective prior to introduction or population explosions. Supporting aquatic invasive species projects and programs of local lake associations for water quality will also be considered under this plan. Appropriate invasive species inventory and control projects may be completed as funding, staffing, and partnerships become available. Standard machinery cleaning and inspection practices will be enforced for all forestry and development projects which include earth moving on the County Forest.

Forest Habitat Opportunities:

The County forest presents a major opportunity for management and maintenance of dry jack pine forests and dry-mesic eastern white pine-red pine forests which provide wildlife habitat for specific species. On the County Forest, these types could be managed in the wide range of patch sizes, age classes, seral stages, and environmental settings, characteristic of naturally occurring Northern Dry-mesic types.

Less abundant forest types including northern red oak and pin oak, mesic hemlock-hardwood and northern hardwood forests; swamp conifers of black spruce, tamarack, or northern white-cedar; dry and hardwood swamps provide good management opportunities to maintain habitat diversity on the County Forest. Management for maintenance of these types on the landscape to preclude transitions to other types will be considered within this plan.

Northern red oak, important for both ecological and economic reasons, is now a major forest component in some stands. On proper sites Northern red oak can be managed and expanded on the County forest for improved wildlife habitat and economic returns.

White birch is declining, and regeneration has proven difficult on many sites in the absence of fire. Consideration could be given to utilization of prescribed fire to benefit species which historically developed with fire on the landscape.

County forest blocking creates opportunities to manage at large scales across ownerships within

the exterior boundaries of the County forest. Coordination of management with large landowners and forest management assistance for small landowners within the boundaries provide opportunities for landscape scale management practices. Purchase of additional County forest acreage also provides an opportunity improvement in large scale management. These practices provide opportunities to meet the needs of interior forest wildlife and bird species.

The County forest offers opportunity for the development and restoration of older forests of eastern white pine, red pine, northern red oak, hemlock hardwoods, northern hardwoods, and swamp conifers. As a working forest this could be accomplished with extended rotations, the development of old-growth forest characteristics, and stands of “managed old-growth.”

The forest historically consisted of a diverse mosaic of habitats, patch sizes, stand ages, ecotones, and aquatic features. Although management is often conducted at the stand-level, there are opportunities on the County forest to plan and coordinate management from a much broader perspective to accommodate all patch sizes and ages for forest communities and to establish and maintain connections between them. This would help maintain the full range of habitat diversity and connectivity needed across the forest and across the associated ecological landscapes.

Fisheries and Water Quality Opportunities:

The County forest has abundant wetlands which provide important habitats and are critical for maintaining water quality. Management opportunities on the County forest include maintaining wetland hydrology and avoiding conversion to other wetland types to provide habitat for numerous wetland-dependent plants and animals.

Lakes connected by perennial streams support a diverse aquatic fauna that includes rare and uncommon species. A majority of development in Vilas County is adjacent to a lake or stream, reducing the diversity and wildlife usage of these areas.

The rivers and streams on the forest provide critical habitat and support many rare species. Significant protection and management opportunities include the headwaters region and upper stretches of the Wisconsin River. Springs and spring ponds on the County Forest offer management opportunities for aquatic species associated and fisheries with cold-water systems.

Maintaining forest cover around and between lakes and streams is needed to maintain high water quality and provide wildlife habitat and maintain fisheries habitat for numerous species.

Protecting undeveloped lakes, restoring disturbed shorelines, and protecting the integrity of lake-stream and wetland complexes are all extremely important water quality and fisheries management opportunities within the County forest.

300.2.7 Rare and Endangered Resources

The Natural Heritage Inventory Database is the most comprehensive source of rare species data for Wisconsin. These data are used for a variety of purposes including research, land management, state land master planning, community planning, conservation planning and review of public and private activities across the state, The NHI Portal is currently available to DNR staff and County Forest staff who hold a data sharing license.

The Wisconsin Historical Preservation Database is the most comprehensive source of cultural resources for Wisconsin. These data are used for a variety of purposes including research, land management, state land master planning, community planning, conservation planning and review of public and private activities across the state, The Wisconsin Historical Preservation Database is currently available to DNR staff and County Forest staff. Wisconsin Threatened species that occur or may occur within the Vilas County Forest include:

VILAS COUNTY NHI LISTING (April 19, 2019)				
Scientific Name	Common Name	WI Status	Federal Status	Group
Hemidactylium scutatum	Four-toed Salamander	SC/H		Rare Amphibians
Lithobates palustris	Pickerel Frog	SC/H		Rare Amphibians
Lithobates septentrionalis	Mink Frog	SC/H		Rare Amphibians
Bombus terricola	Yellowbanded Bumble Bee	SC/N	SOC	Rare Ants, Wasps, and Bees
Bombus perplexus	Confusing Bumble Bee	SC/N		Rare Ants, Wasps, and Bees
Dubiraphia robusta	Robust Dubiraphian Riffle Beetle	SC/N		Rare Beetles
Helophorus latipenis	A Water Scavenger Beetle	SC/N		Rare Beetles
Setophaga kirtlandii	Kirtland's Warbler	END	LE	Rare Birds
Chlidonias niger	Black Tern	END	SOC	Rare Birds
Accipiter gentilis	Northern Goshawk	SC/M	SOC	Rare Birds

Vermivora chrysoptera	Golden-winged Warbler	SC/M	SOC	Rare Birds
Setophaga cerulea	Cerulean Warbler	THR	SOC	Rare Birds
Ammodramus leconteii	LeConte's Sparrow	SC/M		Rare Birds
Ammodramus nelsoni	Nelson's Sparrow	SC/M		Rare Birds
Antrostomus vociferus	Eastern Whip-poor-will	SC/M		Rare Birds
Asio otus	Long-eared Owl	SC/M		Rare Birds
Botaurus lentiginosus	American Bittern	SC/M		Rare Birds
Bucephala clangula	Common Goldeneye	SC/M		Rare Birds
Catharus ustulatus	Swainson's Thrush	SC/M		Rare Birds
Chordeiles minor	Common Nighthawk	SC/M		Rare Birds
Contopus cooperi	Olive-sided Flycatcher	SC/M		Rare Birds
Empidonax minimus	Least Flycatcher	SC/M		Rare Birds
Oporornis agilis	Connecticut Warbler	SC/M		Rare Birds
Perisoreus canadensis	Canada Jay	SC/M		Rare Birds
Picoides arcticus	Black-backed Woodpecker	SC/M		Rare Birds
Poecile hudsonicus	Boreal Chickadee	SC/M		Rare Birds
Regulus calendula	Ruby-crowned Kinglet	SC/M		Rare Birds
Buteo lineatus	Red-shouldered Hawk	THR		Rare Birds
Coturnicops noveboracensis	Yellow Rail	THR		Rare Birds
Falcipennis canadensis	Spruce Grouse	THR		Rare Birds
Pieris virginiensis	West Virginia White	SC/N		Rare Butterflies and Moths
Banksiola doxatrypa	A Giant Casemaker Caddisfly	SC/N		Rare Caddisflies
Aeshna clepsydra	Mottled Darner	SC/N		Rare Dragonflies and Damselflies
Somatochlora cingulata	Lake Emerald	SC/N		Rare Dragonflies and Damselflies

Somatochlora forcipata	Forcinate Emerald	SC/N		Rare Dragonflies and Damselflies
Etheostoma microperca	Least Darter	SC/N		Rare Fishes
Lepomis megalotis	Longear Sunfish	THR		Rare Fishes
Notropis anogenus	Pugnose Shiner	THR		Rare Fishes
Canis lupus	Gray Wolf	SC/FL	LE	Rare Mammals
Martes americana	American Marten	END		Rare Mammals
Sorex palustris	Water Shrew	SC/N		Rare Mammals
Glaucomys sabrinus	Northern Flying Squirrel	SC/P		Rare Mammals
Myotis lucifugus	Little Brown Bat	THR		Rare Mammals

A review of the Natural Heritage Inventory (NHI) indicates the presence of a number of rare species, natural communities and unique natural features on the Vilas County Forest. If present on a site or within a buffer area, changes in projects may be required to meet legal requirements and forest certification standards for protection of rare species, natural communities and unique natural features. Under this plan, all forestry and development projects will include an evaluation phase, utilizing Wisconsin DNR NHI Protocol to determine whether an NHI screening and mitigation action is required.

300.2.8 Water Resources

Vilas County has 96,693 acres of water involving 1,321 named lakes and flowages and 402 miles of streams.

Of the stream 71.6 miles are Class I Trout streams and 48.2 miles are Class II Trout streams, 24 spring ponds encompassing 48.1 acres are Class I Trout waters, 10 ponds and 7 lakes encompassing 121.0 acres are Class II Trout waters and 1 pond encompassing 4.8 acres are Class II Trout waters

Vilas County has 18 lakes covering 17,376 acres which are classified as Outstanding and Exceptional Resource Waters including:

Vilas County ORW & ERW Lakes
Black Oak Lake

Crab Lake
Crystal Lake (T41n R07e S27)
Elvoy Springs
Lac Vieux Desert
Palette Lake (Clear)
Partridge Lake
Plum Lake
Star Lake
Stormy Lake
Trout Lake
Twin Lakes
Twin Lakes
White Sand Lake T42n R07e S26
Benson Lake
Sturgeon Lake
North Trout Creek Springs
Vance Lake (Dam, Dan)

Vilas County has 25 ponds covering 37.7 acres which are classified as Outstanding and Exceptional Resource Waters including:

Vilas County ORW & ERW Ponds
Elvoy Springs Allequash Springs Un Spring Spring Meadow Springs pond Spring Meadow Creek Springs Spring Meadow Creek Springs Spring Meadow Creek Springs Spring Meadow Springs pond Blackjack Springs Rainbow Spring Unnamed (Sucker Creek Springs) North Trout Creek Springs North Trout Creek Springs

North Trout Creek Springs
 North Trout Creek Springs
 North Trout Creek Springs
 Un Spring
 Un Spring
 Un Spring
 Un Spring
 Blackjack Creek Springs
 North Trout Creek Springs
 Lower Spring Meadow
 Springs
 Lower Spring Meadow
 Springs
 Blackjack Springs

Vilas County also has 50 streams totaling 172.9 miles which are classified as Outstanding and Exceptional Resource Waters including:

Vilas County ORW & ERW Streams

Elvoy Springs
 Allequash Creek
 Allequash Creek
 Brule Creek
 Brule Creek
 Deerskin River
 E. Br. Blackjack Cr, Golddigger Creek
 Elvoy Creek
 Elvoy Creek
 Manitowish River
 Manitowish River
 Mishonagon Creek
 Plum Creek
 Plum Creek
 Siphon Creek
 Spring Meadow Creek
 Tamarack Creek
 Tamarack Creek
 Trout River
 Spring Meadow Creek Springs
 Spring Meadow Creek Springs
 Spring Meadow Springs

Spring Meadow Creek Springs

Elvoy Creek & Springs

W. Fk. Tamarack Creek

Wisconsin River

Beaver Creek

Blackjack Creek

Little Deerskin River

Manitowish River

Mcginnis Creek

Military Creek

Muskrat Creek

North Creek

Pine Creek

Pioneer Creek

Stella Creek

Sucker Creek

Blackjack Springs feeder

North Trout Creek Springs

North Trout Creek Springs

Blackjack Springs outlet

Lower Spring Meadow Springs

Lower Spring Meadow Springs

North Trout Creek Springs

Creek 33-5 T41n R10e

Unnamed Creek (T41n,R11e,S35,Ssw,64)

Lower Spring Meadow Springs

North Trout Creek Springs

Unnamed Creek (T41n,R10e,S33,Nenw,64)

Wisconsin River

Note: An entire listing of the outstanding and exceptional resource waters can be found in Wisconsin Admin. Code NR102.10 and 102.11.

A complete inventory of the surface water resources in Vilas County can be found in **Appendix**

300.3 CULTURAL FACTORS

300.3.1 Economy

The importance of the County Forests to Wisconsin's economic health continues to rise. County Forests sustain over 60,000 full-time jobs derived from logging, trucking, paper production, manufactured building materials, and lumber. Many other jobs are created in such businesses as the expanding printing industry and are located far from the forested northland. County Forests contribute to the 24 billion dollar forest industry in Wisconsin.

In addition, the lands managed by these 29 counties provide an important recreation resource to complement our state's valuable tourism industry. Tourists spend valuable money at local businesses. By providing 2.4 million acres of public recreation land, we bring tourist to our state. As population increases and public access to privately owned forestland decreases, the need for accessible lands unquestionably will assume an ever more important role. More information on the economic impact of the County Forest program can be found at <https://www.wisconsincountyforests.com/>

Production of forest products and spin-off industries derived from the recreational opportunities on the Forest and the forest products it produces are vitally important to Vilas County's economic well-being.

Tourism and Recreation is the #1 ranked employer in Vilas County. (Need more information?) Forest industry is the #6 ranked employer in the County providing 421 direct positions and 383 indirect positions with a total direct output of \$57.9 million and an indirect output of \$39.3. A total of \$2.872 million in tax is generated by the forest of Vilas County. More information can be found at the following link: <https://dnr.wi.gov/topic/forestbusinesses/factsheets.html>

300.3.2 EDUCATION AND RESEARCH

Education and research continue to be critical components in making decisions that affect our natural resources. As public needs and demands of our forest and its products increase, we must be prepared to assure that sound decisions result. To this end, Vilas County encourages and supports research efforts that relate to the forest, and educational opportunities that will promote a better understanding of forest communities and management.

300.4 OTHER PUBLIC LANDS OWNERSHIP

Vilas County Forest shares a common boundary with Northern Highlands American Legion State Forest. Roads and trails are connected without interruption between the public lands providing for a more enjoyable experience for the user groups. In addition to State forest acres, 42,269 acres of the Chequamegon-Nicolet National Forest is also located within Vilas County. Vilas County will pursue opportunities for relationships under "Good Neighbor", Stewardship Contracting, and Stewardship Agreement Authorities and Government to Government Coordination as outlined in Federal policy and regulations to benefit Vilas County. Vilas County will continue to form and build relationships with other adjacent public lands and land managers in the best interest of the Vilas County.